Access DB# 191789

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Bret Chen Examiner #: 74195 Date: 6/1/06
Art Unit: 1762 Phone Number ~~30~~ 2-1417 Serial Number: 10/720838
Mail Box and Bldg/Room Location: Rem 8C79 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Process for Producing a Tantalum Pentoxide Layer

Inventors (please provide full names):

Earliest Priority Filing Date: 11/26/2002

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

A method for forming a tantalum pentoxide film by using the ~~highlighted~~ highlighted material as a precursor

SCIENTIFIC REFERENCE BR
Sci & Tech Inf Ctr
JUN 2 REC'D
Pat. & T.M. Office

No RUSH

Thanks,
bc

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STAFF USE ONLY	Type of Search	Vendors and cost where applicable
Searcher: EJ	NA Sequence (#)	STN
Searcher Phone #:	AA Sequence (#)	Dialog
Searcher Location:	Structure (#)	Questel/Orbit
Date Searcher Picked Up:	Bibliographic	Dr.Link
Date Completed: 6-2-06	Litigation	Lexis/Nexis
Searcher Prep & Review Time:	Fulltext	Sequence Systems
Clerical Prep Time:	Patent Family	WWW/Internet
Online Time:	Other	Other (specify)

PTO-1590 (8-01)

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FILE 'REGISTRY' ENTERED AT 16:25:17 ON 02 JUN 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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                  E C16H39N4TA
L1              5 S E3
                  SEL L1 1,2,4 RN
L2              3 S E1-E3
                  E TANTALUM PENTOXIDE/CN
L3              1 S E3
L4              2 S E4 OR E5
L5              2 S L3 OR L4
L6            172 S (TA(L)O)/ELS (L) 2/ELC.SUB

     FILE 'HCA' ENTERED AT 16:13:42 ON 02 JUN 2006
L7             65 S L2
L8          27302 S L5 OR L6 OR TA2O5 OR (TANTALUM# OR TA)(W)(OXIDE# OR PEN
L9             15 S L7 AND L8
L10        115642 S (CVD OR (CHEMICAL? OR CHEM)(2A)(VAPOR? OR VAPOUR?)(2A)D
L11            39 S L7 AND L10

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L12           380 S (C(L)H(L)N(L)TA)/ELS (L) 4/ELC.SUB
L13            25 S L12 AND 1/TA AND 4/N AND NO RSD/FA

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L14           105 S L13
L15            19 S L14 AND L8
L16            66 S L14 AND L10

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                  SEL L1 4 RN
L17             1 S E1

     FILE 'HCA' ENTERED AT 16:18:55 ON 02 JUN 2006
L18            65 S L17
L19            39 S L18 AND L10
L20             4 S L15 NOT L9
L21            27 S L19 NOT (L9 OR L20)
L22            14 S L9 AND 1840-2002/PY,PRY
L23             3 S L20 AND 1840-2002/PY,PRY
L24            15 S L21 AND 1840-2002/PY,PRY
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L22 ANSWER 1 OF 14 HCA COPYRIGHT 2006 ACS on STN
140:416445 Process and device for forming a layer of **tantalum pentoxide** on a carrier material, in particular titanium nitride, and integrated circuit incorporating a layer of **tantalum pentoxide**. Gros, Jean Mickael; Jourdan, Nicolas; Michailos, Jean (Stmicroelectronics SA, Fr.). Fr. Demande FR 2847593 A1 20040528, 22 pp. (French). CODEN: FRXXBL. APPLICATION: FR 2002-14798 20021126.

AB One heats carrying material at a temp. between 200.degree.C and 400.degree.C, and one makes circulate in contact with heated carrying material a gas mixt. contg. tert-butylimido-tris-diethyl amino tantalum (t-BuN = Ta(NEt2)3) under oxidizing atm., the partial pressure of the tert-butylimido-tris-diethyl amino tantalum being higher or equal to 25 mTorr.

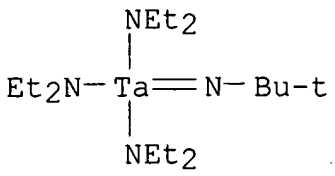
IT **1314-61-0P, Tantalum pentoxide**
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)

RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)

RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)

same applicant



IC ICM C23C016-448
ICS H01L021-316; H01L021-02; C23C016-40; C30B029-30
CC 76-14 (Electric Phenomena)
Section cross-reference(s): 75
ST process forming layer **tantalum oxide** titanium nitride integrated circuit; device forming layer **tantalum oxide** titanium nitride integrated circuit
IT Vapor deposition process
(chem.; process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)
IT Electric insulators
Integrated circuits
Partial pressure
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)
IT Transition metals, processes
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)
IT **1314-61-0P, Tantalum pentoxide**
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)
IT 1314-23-4, Zirconia, processes 1344-28-1, Alumina, processes 7440-21-3, Silicon, processes 7631-86-9, Silica, processes 12033-89-5, Silicon nitride, processes 12055-23-1, Hafnia
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)
IT 7727-37-9, Nitrogen, processes **169896-41-7**
(process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of

tantalum pentoxide)

IT 7429-90-5, Aluminum, processes 7440-06-4, Platinum, processes
7440-18-8, Ruthenium, processes 7440-25-7, Tantalum, processes
7440-32-6, Titanium, processes 7440-50-8, Copper, processes
12033-62-4, Tantalum nitride 25583-20-4, Titanium nitride
(substrate; process and device for forming layer of **tantalum pentoxide** on carrier material, in particular titanium nitride, and integrated circuit incorporating layer of **tantalum pentoxide**)

L22 ANSWER 2 OF 14 HCA COPYRIGHT 2006 ACS on STN

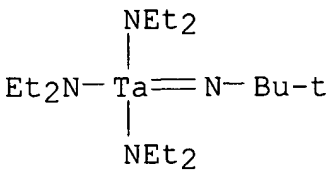
140:295713 Substrate processing unit, substrate processing method, and cleaning method of substrate processing unit. Ishizaka, Tadao; Kawamura, Kohei; Yokoi, Hiroaki; Shimizu, Takaya; Shigeoka, Takashi; Oshima, Yasuhiro; Kojima, Yasuhiko (Tokyo Electron, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2004095701 A2 20040325, 25 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-252273 20020830.

AB The substrate processing unit has a substrate processing chamber, a gas supply system for supplying .gtoreq.2 processing gases to the processing chamber, a discharge system provided with a pump for discharging the processing gases from the processing chamber, and a processing gas capturing unit contg. fine particles and installed between the processing chamber and the pump for capturing at least one processing gas from the processing chamber by the fine particles. The processing method includes putting a substrate in the processing chamber, feeding a metal-contg. gas at a 1st flow rate (V1) to the processing chamber, discharging the metal-contg. gas from the processing chamber through the discharge system, feeding a nitriding agent gas at .gtoreq.10V1 to the processing chamber, and discharging the nitriding agent gas from the processing chamber. The cleaning method of the substrate processing unit includes a process of feeding a nitriding agent gas to the substrate processing unit when no substrate is kept in the unit. The clogging of the discharge system can be reduced. The processing gas is TiF4, TiCl4, TiBr4, TiI4, Ti[N(C2H5CH3)2]4, Ti[N(CH3)2]4, Ti[N(C2H5)2]4, TaF5, TaCl5, TaBr5, TaI5, Ta(NC(CH3)3)(N(C2H5)2)3, Ta(OC2H5)5, Al(CH3)3, Zr(O-tert-(C4H9))4, ZrCl4, SiH4, Si2H6, SiH2Cl2, and/or SiCl4.

IT **169896-41-7**
(in claim 4 on p.2; substrate processing unit, substrate processing method, and cleaning method of substrate processing unit)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IT **1314-61-0, Tantalum pentoxide**
(substrate processing unit, substrate processing method, and cleaning method of substrate processing unit)
RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM H01L021-285
ICS B08B005-00; C23C016-44; H01L021-31
CC 76-3 (Electric Phenomena)
IT 75-24-1 2081-12-1 3275-24-9 **169896-41-7** 175923-03-2
(in claim 4 on p.2; substrate processing unit, substrate processing method, and cleaning method of substrate processing unit)
IT **1314-61-0, Tantalum pentoxide**
1344-28-1, Alumina, uses 1590-87-0, Silicon hydride (Si2H6) 4109-96-0, Silicon chloride hydride (SiCl2H2) 4419-47-0 6074-84-6, Tantalum ethoxide 7550-45-0, Titanium chloride (TiCl4), uses 7664-41-7, Ammonia, uses 7720-83-4, Titanium iodide (TiI4) 7721-01-9, Tantalum chloride (TaCl5) 7783-63-3, Titanium fluoride (TiF4) 7783-71-3, Tantalum fluoride (TaF5) 7789-68-6, Titanium bromide (TiBr4) 7803-62-5, Silicon hydride (SiH4), uses 10026-04-7, Silicon chloride (SiCl4) 10026-11-6, Zirconium chloride (ZrCl4) 13451-11-1, Tantalum bromide (TaBr5) 14693-81-3, Tantalum iodide (TaI5) 25583-20-4, Titanium nitride 167493-27-8, Titanium nitride silicide (TiNSi)
(substrate processing unit, substrate processing method, and cleaning method of substrate processing unit)

L22 ANSWER 3 OF 14 HCA COPYRIGHT 2006 ACS on STN
140:85931 Fabrication of a dual gate semiconductor device having a metal nitride layer. Choi, Gil-heyun; Lee, Jong-ho; Choi, Kyung-in; Kim, Byung-hee (Samsung Electronics Co., Ltd., S. Korea). U.S. Pat. Appl. Publ. US 2004005749 A1 20040108, 14 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-425276 20030429. PRIORITY: KR 2002-37852 20020702.
AB The invention relates to the fabrication of a dual gate semiconductor device having a metal nitride layer, where the nitride layer is doped to be nitrogen-rich for the purpose of increasing its work function. The method consists of the steps of (i) providing a semiconductor substrate having a first region of a first cond. type

and a second region of a second cond. type; (ii) forming a gate insulating layer on the semiconductor substrate; (iii) forming an initial metal nitride layer on the gate insulating layer, opposite to the semiconductor substrate; implanting nitrogen ions into the initial metal nitride layer in the second transistor region to form a nitrogen-rich metal nitride layer; (iv) patterning the initial metal nitride layer to form a first gate electrode in the first region; and (v) patterning the nitrogen-rich metal nitride layer to form a second gate electrode in the second region, where a work function of the nitrogen-rich metal nitride layer is higher than that of the initial metal nitride layer.

IT **1314-61-0, Tantalum oxide (Ta2O5)**
(dielec.; fabrication of dual gate semiconductor device having metal nitride layer)

RN 1314-61-0 HCA

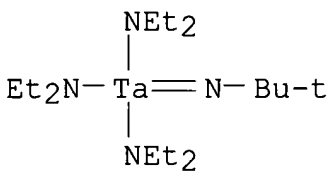
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**
(fabrication of dual gate semiconductor device having metal nitride layer)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-336
ICS H01L021-8234; H01L021-8238

INCL 438197000; 438199000; 438275000; 438283000

CC 76-3 (Electric Phenomena)
Section cross-reference(s): 75

IT 1314-23-4, Zirconia, uses 1314-36-9, Yttria, uses **1314-61-0, Tantalum oxide (Ta2O5)** 1344-28-1, Alumina, uses 12055-23-1, Hafnium oxide 13463-67-7, Titania, uses
(dielec.; fabrication of dual gate semiconductor device having metal nitride layer)

IT **169896-41-7**
(fabrication of dual gate semiconductor device having metal nitride layer)

L22 ANSWER 4 OF 14 HCA COPYRIGHT 2006 ACS on STN

139:402564 Methods of forming capacitors and integrated circuit devices including tantalum nitride. Choi, Kyung-in; Choi, Gil-heyun; Kim, Byung-hee; Kang, Sang-bum (S. Korea). U.S. Pat. Appl. Publ. US 2003219942 A1 20031127, 22 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-408631 20030407. PRIORITY: KR 2002-29102 20020525.

AB The present invention relates to methods of forming capacitors, and more particularly, to methods of forming capacitor electrodes. Methods of forming a capacitor can include forming a capacitor electrode including Ta nitride. The capacitor electrode can be formed using a Ta precursor including Ta elements and bonding elements that are chem. bonded to the Ta elements. Also, the Ta precursor can include at least one of a Ta amine deriv. and/or a Ta halide deriv. Related methods of forming integrated circuit devices are also discussed.

IT **1314-61-0**, Tantala
(dielec. layer; methods of forming capacitors and integrated circuit devices including tantalum nitride)

RN 1314-61-0 HCA

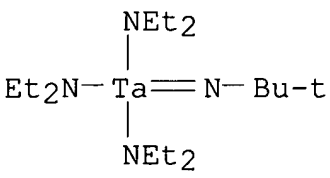
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**, tert-Butylimido tris(diethylamido) tantalum
(vapor deposition precursor; methods of forming capacitors and integrated circuit devices including tantalum nitride)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-8234
ICS H01L021-8244; H01L021-8242; H01L021-20; H01L021-44

INCL 438253000; 438396000; 438681000

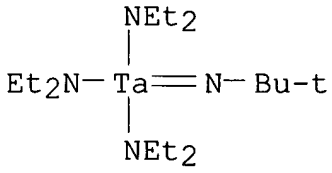
CC 76-3 (Electric Phenomena)

IT 1314-23-4, Zirconia, uses 1314-36-9, Yttria, uses **1314-61-0**, Tantala 1344-28-1, Alumina, uses 12047-27-7, Barium titanate, uses 12055-23-1, Hafnium oxide (HfO2) 12060-59-2, Strontium titanate 13463-67-7, Titania, uses
(dielec. layer; methods of forming capacitors and integrated circuit devices including tantalum nitride)

IT 7721-01-9, Tantalum pentachloride 7783-71-3, Tantalum pentafluoride 13451-11-1, Tantalum pentabromide 14693-81-3, Tantalum pentaiodide **169896-41-7**, tert-Butylimido

tris(diethylamido) tantalum
(vapor deposition precursor; methods of forming capacitors and integrated circuit devices including tantalum nitride)

L22 ANSWER 5 OF 14 HCA COPYRIGHT 2006 ACS on STN
138:279838 Manufacturing method for dielectric layer of capacitor.
Huang, Guo-Tai; You, Tsuei-Rung (United Microelectronics Corp., Taiwan). Taiwan. TW 410441 B **20001101**, 17 pp.
(Chinese). CODEN: TWXXA5. APPLICATION: TW 1999-88110830 19990628.
AB Organometallic precursor for depositing **Ta oxide** dielec. layer on elec. capacitor is described. The single phase **Ta oxide** dielec. layers are formed by MOCVD. The dielec. const. of the dielec. layer can be adjusted by adjusting the compn. of the precursor. The process is used for the fabrication of DRAM memories.
IT **1314-61-0P, Tantalum oxide Ta2O5**
(MOCVD with organometallic precursor for dielec. layer of capacitor for DRAM device fabrication)
RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **169896-41-7**
(MOCVD with organometallic precursor for dielec. layer of capacitor for DRAM device fabrication)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-8242
ICS H01L021-76
CC 76-10 (Electric Phenomena)
ST organometallic precursor **tantalum oxide** dielec capacitor DRAM
IT **1314-61-0P, Tantalum oxide Ta2O5**
(MOCVD with organometallic precursor for dielec. layer of capacitor for DRAM device fabrication)
IT 6074-84-6, Tantalum pentaethoxide **169896-41-7**
172901-22-3 177580-52-8 177580-53-9 238757-13-6
(MOCVD with organometallic precursor for dielec. layer of capacitor for DRAM device fabrication)

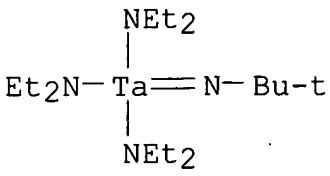
L22 ANSWER 6 OF 14 HCA COPYRIGHT 2006 ACS on STN
138:81056 Liquid precursor mixtures for deposition of multicomponent metal containing materials. Senzaki, Yoshihide; Roberts, David Allen; Norman, John Anthony Thomas; Hochberg, Arthur Kenneth (Air Products and Chemicals, Inc., USA). U.S. US 6503561 B1 20030107, 7 pp., Cont.-in-part of U.S. 6,238,734. (English). CODEN: USXXAM. APPLICATION: US 2000-546452 20000410. PRIORITY: US 1999-350074 19990708.

AB The present invention is a compn. for deposition of a mixed metal or metal compd. layer, comprising a solventless mixt. of at least 2 metal-ligand complex precursors, wherein the mixt. is liq. at ambient conditions and the ligands are the same and are selected from the group consisting of alkyls, alkoxides, halides, hydrides, amides, imides, azides cyclopentadienyls, carbonyls, and their fluorine, oxygen and nitrogen substituted analogs. The present invention is also a process for deposition of a multiple metal or metal compd. layer on a substrate of an electronic material, comprising: (a) providing a solventless mixt. of .gtoreq.2 metal-ligand complex precursors which constitute a liq. at ambient conditions, wherein the ligands are the same and are selected from the group consisting of alkyls, alkoxides, halides, hydrides, amides, imides, azides, nitrates, cyclopentadienyls, carbonyls, pyrazoles, and their fluorine, oxygen and nitrogen substituted analogs; (b) delivering the solventless mixt. by direct liq. injection to a flash vaporization zone to vaporize the solventless mixt.; (c) contacting the substrate under deposition conditions with a resulting vapor of the solventless mixt.; and (d) depositing a multiple metal or metal compd. layer on the substrate from the solventless mixt.

IT **59763-75-6, Tantalum oxide**
(liq. precursor mixts. for deposition of Al-doped TaOx)
RN 59763-75-6 HCA
CN Tantalum oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Ta	x	7440-25-7

IT **169896-41-7**, (tert-Butylimido)tris(diethylamido)tantalum
(precursor; liq. precursor mixts. for deposition of multicomponent metal contg. materials)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-18
INCL 427226000; 427229000; 427240000; 427244000; 427255310; 427255320; 427255394
CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76
IT **59763-75-6, Tantalum oxide**
(liq. precursor mixts. for deposition of Al-doped TaOx)
IT 11139-79-0, Aluminum **tantalum oxide**
52337-09-4, Silicon titanium oxide 60866-78-6, Tantalum titanium oxide 121368-53-4, Titanium nitride silicide 132085-96-2, Zirconium nitride silicide 149661-61-0, Tantalum zirconium oxide 159610-42-1, Tin titanium zirconium oxide 163332-36-3, Hafnium silicon oxide 163332-39-6, Niobium silicon oxide 164144-81-4, Vanadium nitride silicide 169279-91-8, Hafnium nitride silicide 173955-94-7, Niobium nitride silicide 174179-90-9, Silicon vanadium oxide 174633-44-4, Silicon zirconium oxide 227205-68-7, Tantalum zirconium nitride
(liq. precursor mixts. for deposition of multicomponent metal contg. materials)
IT 555-75-9, Aluminum triethoxide 3275-24-9, Titanium tetrakis(dimethylamide) 4419-47-0, Titanium tetrakis(diethylamide) 6074-84-6, Tantalum pentaethoxide 13801-49-5, Zirconium tetrakis(diethylamide) 17048-10-1, Tetrakis(diethylamino)silane 19782-68-4, Methanamine, N-methyl-, hafnium(4+) salt 19824-59-0, Tantalum pentakis(dimethylamide) 19824-60-3 21941-96-8, Tetrakis(diethylamino)stannane 67313-80-8 **169896-41-7**, (tert-Butylimido)tris(diethylamido)tantalum 318277-05-3
(precursor; liq. precursor mixts. for deposition of multicomponent metal contg. materials)

L22 ANSWER 7 OF 14 HCA COPYRIGHT 2006 ACS on STN
136:333822 Low-temperature integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors. Urdahl, Randall S.; Narwankar, Pravin K.; Athreya, Shankarram A.; Sinensky, Asher K.; Mendoza, Andrea M. (Applied Materials, Inc., USA). PCT Int. Appl. WO 2002031873 A1 **20020418**, 37 pp. DESIGNATED STATES: W: CN, JP, KR; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US42452 20011001. PRIORITY: US 2000-2000/686451 20001010.

AB The present invention provides a method of integrating **Ta oxide** into an MIM capacitor for a semiconductor device, comprising the step of vapor-depositing the **Ta oxide** from an O-free liq. precursor and under process conditions comprising a deposition temp. of .ltorsim.500.degree. and a deposition pressure of .ltorsim.96 torr, wherein the **Ta oxide** is integrated into the MIM capacitor. Also provided is a method of forming an MIM capacitor comprising the step of integrating a **Ta oxide** dielec. film with a Ta nitride or a Ti nitride bottom electrode deposited on a substrate and a Ti nitride top electrode thereby forming an MIM capacitor.

IT **1314-61-0P, Tantalum pentoxide**
(low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)

RN 1314-61-0 HCA

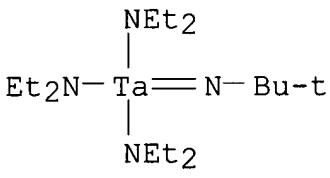
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**
(precursor; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-285
ICS H01L021-318; H01L021-8234; H01L021-469; H01L021-31

CC 76-3 (Electric Phenomena)
Section cross-reference(s): 75

ST OMCVD annealing **tantalum oxide** MIM capacitor

IT Capacitors
(MIM; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)

IT Annealing
Capacitor electrodes
Dielectric films
(low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)

IT Vapor deposition process
(metalorg.; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)
IT Annealing
(plasma; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)
IT Electric capacitance
Electric current-potential relationship
Leakage current
Thickness
(**tantalum oxide**; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)
IT **1314-61-0P, Tantalum pentoxide**
(low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)
IT 12033-62-4, Tantalum nitride 25583-20-4, Titanium nitride
(low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)
IT 7782-44-7, Oxygen, processes
(plasma annealing; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)
IT 67313-80-8 **169896-41-7** 402912-90-7
(precursor; low-temp. integration of CVD **tantalum oxide** with titanium nitride and tantalum nitride to form MIM capacitors)

L22 ANSWER 8 OF 14 HCA COPYRIGHT 2006 ACS on STN
136:286888 Vapor deposition of metal oxides, silicates and phosphates, and silicon dioxide. Gordon, Roy G.; Becker, Jill; Hausmann, Dennis; Suh, Seigi (President and Fellows of Harvard College, USA). PCT Int. Appl. WO 2002027063 A2 **20020404**, 51 pp. DESIGNATED STATES: W: JP, KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US30507 20010928. PRIORITY: US 2000-2000/PV23628U 20000928; US 2000-2000/PV253917 20001129.
AB Metal silicates or phosphates are deposited on a heated substrate by the reaction of vapors of alkoxysilanols or alkylphosphates along with reactive metal amides, alkyls or alkoxides. For example, vapors of tris-(ter-butoxy)silanol react with vapors of tetrakis(ethylmethylamido)hafnium to deposit Hf silicate on surfaces heated to 300.degree.. The product film has a very uniform stoichiometry throughout the reactor. Similarly, vapors of

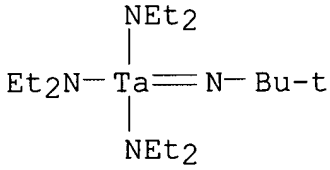
diisopropylphosphate react with vapors of Li bis(ethyldimethylsilyl)amide to deposit Li phosphate films on substrates heated to 250.degree.. Supplying the vapors in alternating pulse produces these same compns. with a very uniform distribution of thickness and excellent step coverage.

IT **1314-61-0, Tantalum oxide (Ta2O5)**
(vapor deposition of metal oxides by exposing heated surface alternately to metal amides then to water or alc.)

RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**, (tert-Butylimido)tris(diethylamido)tantalum
(vapor deposition of metal silicates and phosphates by reacting alkoxysilanol or alkylphosphates with metal or metalloid compd.)

RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-40
CC 75-1 (Crystallography and Liquid Crystals)

IT 75-65-0, tert-Butanol, processes 1314-23-4, Zirconium diOxide, processes **1314-61-0, Tantalum oxide (Ta2O5)** 7631-86-9, Silicon dioxide, processes 7732-18-5, Water, processes 12055-23-1, Hafnium Oxide
(vapor deposition of metal oxides by exposing heated surface alternately to metal amides then to water or alc.)

IT 75-24-1, Trimethylaluminum 121-43-7, Trimethyl borate 506-82-1, Dimethylcadmium 542-63-2, Diethylberyllium 544-97-8, Dimethylzinc 546-68-9, Tetrakis(isopropanolato)titanium 557-20-0, Diethylzinc 593-91-9, Trimethylbismuthine 617-85-6, Triethylstibine 813-78-5 867-97-0, Tris(diethylamino)borane 1066-77-9, Tetrakis(dimethylamino)stannane 1070-89-9, Sodium bis(trimethylsilyl)amide 1271-24-5, Chromocene 1271-86-9 1272-21-5, Tris(.eta.5-cyclopentadienyl)gadolinium 1272-23-7, Tris(.eta.5-cyclopentadienyl)lanthanum 1272-26-0, Tris(.eta.5-cyclopentadienyl)thulium 1273-98-9, Tris(.eta.5-cyclopentadienyl)neodymium 1277-43-6, Cobaltocene 1277-47-0, Vanadocene 1294-07-1, Tris(.eta.5-cyclopentadienyl)yttrium 1295-20-1, Tris(.eta.5-cyclopentadienyl)ytterbium 1298-53-9, Tris(.eta.5-

cyclopentadienyl)cerium 1298-54-0 1298-55-1,
Tris(.eta.5-cyclopentadienyl)samarium 1312-81-8, Lanthanum oxide
1316-98-9 1335-30-4, Aluminum Silicate 1445-79-0,
Trimethylgallium 1611-31-0 1624-01-7,
Tetrakis(dimethylamino)silane 2081-12-1, Tetrakis(tert-
butanolato)zirconium 2172-02-3 3236-82-6 3275-24-9,
Tetrakis(dimethylamido)titanium 3323-04-4,
Bis(bis(trimethylsilyl)amido)cadmium 3385-78-2, Trimethylindium
3999-27-7, Bis(bis(trimethylsilyl)amido)zinc 4039-32-1, Lithium
bis(trimethylsilyl)amide 4104-81-8 4375-83-1,
Tris(dimethylamino)borane 4419-47-0, Tetrakis(diethylamido)titaniu
m 6074-84-6 6596-96-9, Hexamethylarsenous triamide 7289-92-1
7344-40-3, Tetrakis(dimethylamino)germane 7529-46-6 7529-48-8
7566-57-6 10377-52-3, Lithium Phosphate 11077-59-1,
Tris(cyclopentadienyl) praseodymium 12078-25-0,
Dicarbonyl(.eta.5-cyclopentadienyl)cobalt 12212-68-9,
Bis(ethylbenzene)chromium 12261-30-2 12636-72-5,
Bis(.eta.5-cyclopentadienyl)dimethylzirconium 13801-49-5,
Tetrakis(diethylamido)zirconium 13859-65-9,
Tetrakis(trifluorophosphine)nickel 14096-82-3,
Tricarbonyl(nitrosyl)cobalt 14314-61-5 14760-22-6,
Bis(bis(trimethylsilyl)amido)iron 15112-89-7,
Tris(dimethylamino)silane 15821-76-8 16530-82-8 17048-10-1,
Tetrakis(diethylamino)silane 18166-43-3 18741-03-2, Magnesium
bis(bis(trimethylsilyl)amide) 19756-04-8,
Tetrakis(dimethylamido)zirconium 19782-68-4,
Tetrakis(dimethylamido)hafnium 19824-55-6,
Tetrakis(diethylamido)hafnium 19824-56-7 19824-57-8
19824-58-9, Pentakis(dimethylamido)niobium 19824-59-0 19824-60-3
19851-68-4, Tris(diisopropylamido)chromium 20302-36-7,
Tris(cyclopentadienyl)indium 20607-91-4 21941-96-8,
Tetrakis(diethylamino)stannane 22999-67-3,
Tris(bis(trimethylsilyl)amido)iron 25169-05-5 25605-37-2
25733-02-2, Beryllium, Bis(bis(trimethylsilyl)amino)- 29865-05-2
31978-09-3, Tetrakis(methylamino)silane 32093-39-3,
Hexakis(dimethylamido)dialuminum 32877-00-2,
Bis(ethylbenzene)molybdenum 33851-46-6,
Tetrakis(dimethylamido)molybdenum 33851-47-7 34822-90-7,
Cyclopentadienyl thallium 35450-28-3,
Tris(bis(trimethylsilyl)amido)gallium 35450-29-4,
Tris(bis(trimethylsilyl)amido)indium 35788-99-9,
Tris(bis(trimethylsilyl)amido)lanthanum 35789-00-5,
Tris(bis(trimethylsilyl)amido)praseodymium 35789-01-6,
Tris(bis(trimethylsilyl)amido)samarium 35789-02-7 35789-03-8
35789-04-9, Tris(bis(trimethylsilyl)amido)lutetium 37512-28-0
37512-29-1, Tris(bis(trimethylsilyl)amido)titanium 37512-30-4,
Tris(bis(trimethylsilyl)amido)vanadium 37512-31-5 38182-82-0,
Tetrakis(diethylamino)germane 38227-87-1 39330-74-0,

Tris(.eta.5-cyclopentadienyl)erbium 40678-58-8, Tetrakis(diethylamido)thorium 40678-59-9, Tetrakis(diethylamido)uranium 40949-94-8, Potassium bis(trimethylsilyl)amide 41836-21-9, Tris(bis(trimethylsilyl)amido)cerium 41836-23-1, Tris(bis(trimethylsilyl)amido)neodymium 41836-27-5 41836-28-6, Tris(bis(trimethylsilyl)amido)yttrium 41836-29-7, Tris(bis(trimethylsilyl)amido)ytterbium 51956-20-8, Hexakis(dimethylamido)dimolybdenum 54123-86-3 54935-70-5 55147-59-6, Bis(bis(trimethylsilyl)amino)plumbylene 55147-78-9, Bis(bis(trimethylsilyl)amino)stannylene 55147-79-0 55147-80-3 55147-81-4 55290-25-0, Bis(bis(trimethylsilyl)amino)germylene 55940-04-0 57088-64-9 57088-65-0 59671-98-6 61361-87-3 61361-88-4 62419-10-7 63084-58-2 63226-58-4 63757-86-8, Magnesium bis(cyclopentadienide) 63833-49-8 63833-51-2 64561-25-7 67313-80-8 67506-86-9 67938-78-7 68136-20-9, Lanthanum Silicate 68193-40-8, Bis(.eta.5-tert-butylcyclopentadienyl)dimethylzirconium 68959-87-5 69021-85-8 69021-86-9, Tris(isopropylcyclopentadienyl) praseodymium 69927-52-2, Tris(bis(trimethylsilyl)amido)uranium 70309-68-1 72220-23-6 72220-24-7 72260-43-6 73138-26-8, Bis(.eta.5-cyclopentadienyl)manganese 74507-61-2, Bis(.eta.5-pentamethylcyclopentadienyl)chromium 75504-17-5 75504-18-6 76505-24-3 84079-75-4 84079-76-5 86563-55-5 91308-30-4 91308-32-6 95029-57-5 96350-48-0 98145-63-2, Tetrakis(diethylamido)tantalum 101200-05-9 101923-26-6 103457-72-3, Tris(bis(trimethylsilyl)amido)erbium 109433-86-5 112379-48-3 112379-49-4 114460-02-5 114504-74-4 122528-16-9 122676-67-9, Tris(bis(trimethylsilyl)amido)manganese 122676-68-0 123798-11-8 123798-14-1 126970-21-6 128110-72-5, Aluminum silicon oxide (Al2Si8O19) 130521-76-5 130817-68-4 131297-96-6 131297-97-7, Barium bis(bis(trimethylsilyl)amide) 132644-88-3 133947-38-3 133947-39-4 144356-16-1 153608-51-6 154069-61-1 154294-23-2 156304-61-9, Tris((tert-butyl)(trimethylsilyl)amido)gallium 156304-62-0 **169896-41-7**, (tert-Butylimido)tris(diethylamido)tantalum 175923-04-3 178881-65-7 180335-73-3 192228-19-6 194611-64-8, Tris(diethylamido)gallium 201233-61-6 201941-77-7 207788-38-3 210758-43-3 218613-11-7, Yttrium oxide silicate (YO(SiO3)2) 251984-08-4 261929-98-0 300548-71-4 300548-72-5 300585-49-3 300585-58-4 300585-62-0 308847-87-2 312696-25-6 312739-77-8 329735-69-5 329735-72-0 329735-73-1 352535-01-4 404943-68-6 406462-34-8 406462-35-9 406462-36-0 406462-37-1 406462-38-2 406462-39-3 406462-40-6 406462-41-7 406462-42-8 406462-43-9 406462-44-0 406462-45-1 406462-46-2 406462-47-3 406462-48-4 406462-50-8, Aluminum metaphosphate oxide (Al2(PO3)4O) 406462-53-1 406462-54-2 406462-56-4 406462-59-7 406462-61-1 406462-62-2 406462-63-3, Aluminum silicon oxide (Al2Si16O35)

(vapor deposition of metal silicates and phosphates by reacting

alkoxysilanol or alkylphosphates with metal or metalloid compd.)

L22 ANSWER 9 OF 14 HCA COPYRIGHT 2006 ACS on STN
136:239400 Chemical vapor deposition of **tantalum oxide** using oxygen-free liquid precursors. Urdahl, Randall S.; Narwankar, Pravin K.; Athreya, Shankarrram A.; Sinensky, Asher K.; Mendoza, Andrea M. (Applied Materials, Inc., USA). PCT Int. Appl. WO 2002020870 A1 **20020314**, 27 pp. DESIGNATED STATES: W: CN, JP, KR; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US28061 20010907. PRIORITY: US 2000-658654 20000908.

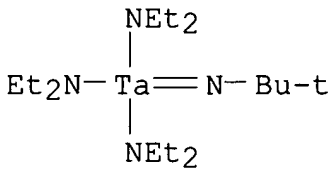
AB The present invention provides a method of depositing **Ta pentaoxide**, comprising the step of vapor-depositing the **Ta pentaoxide** from an oxygen-free liq. precursor and under process conditions comprising a vaporizer temp. of .ltorsim.180.degree., a deposition temp. of .ltorsim.500.degree. and a deposition pressure of .ltorsim.96 torr such that the **Ta pentaoxide** is integrated into the MIM capacitor. Also provided is a method of depositing **Ta pentaoxide**, comprising the step of vapor-depositing the **Ta pentaoxide** from an oxygen-free liq. precursor and under process conditions comprising a vaporizer temp. from .apprx.100.degree. to .apprx.180.degree., a deposition temp. from .apprx.300.degree. to .apprx.500.degree. and a deposition pressure from .apprx.0.5 torr to .apprx.96 torr, such that the **Ta pentaoxide** is integrated into the MIM capacitor.

IT **1314-61-0, Tantalum pentaoxide**
(chem. vapor deposition of **tantalum oxide** using oxygen-free liq. precursors)

RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**
(precursor; chem. vapor deposition of **tantalum oxide** using oxygen-free liq. precursors)

RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)

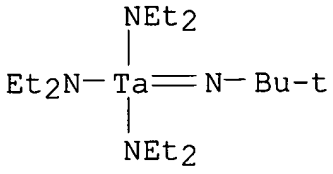


IC ICM C23C016-40
CC 75-1 (Crystallography and Liquid Crystals)

ST metalorg CVD **tantalum oxide** oxygen free liq precursor
IT Vapor deposition process
(metalorg.; chem. vapor deposition of **tantalum oxide** using oxygen-free liq. precursors)
IT **1314-61-0, Tantalum pentaoxide**
(chem. vapor deposition of **tantalum oxide** using oxygen-free liq. precursors)
IT 67313-80-8 **169896-41-7** 402912-90-7
(precursor; chem. vapor deposition of **tantalum oxide** using oxygen-free liq. precursors)

L22 ANSWER 10 OF 14 HCA COPYRIGHT 2006 ACS on STN
135:332896 Purification of organometallic compounds by passage through catalyst bed containing supported palladium and hydrogenated getter alloys. Vergani, Giorgio; Succi, Marco (SAES Getters S.p.A., Italy). PCT Int. Appl. WO 2001078869 A1 **20011025**, 19 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-IT186 20010413. PRIORITY: IT 2000-MI881 20000419; IT 2000-MI891 20000420.
AB Organometallic compds. or heteroat. org. compds. are purified, for removal of oxygen, water and compds. derived from reaction of these compds. with oxygen or water, by passage of the compds. through a catalyst bed contg. 0.4-5 wt.% Pd metal deposited on a porous support (esp. Al2O3), and, optionally, a hydrogenated getter alloy and a mixt. of Fe and Mn on a zeolite support. The purifn. is carried on the compd. of interest, in the form of the pure compd., a vapor, or entrained in a carrier gas, at between -20.degree. and 100.degree. (preferably between room temp. and 50.degree.) and an abs. pressure of 1-10 bars. The purifn. method is esp. useful for purifying organometallic compds. and heteroat. org. compds. to a purity suitable for chem. vapor depositions or semiconductor fabrication.
IT **1314-61-0P, Tantalum pentoxide**
169896-41-7DP, dimethyltellurium
(purifn. of organometallic compds. by passage through catalyst bed contg. supported palladium and hydrogenated getter alloys)
RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM B01D053-02
ICS B01D053-86; C23C016-44

CC 48-1 (Unit Operations and Processes)
Section cross-reference(s): 29, 42, 76

IT 57-14-7P, 1,1-Dimethylhydrazine 75-24-1P, Trimethylaluminum 75-64-9P, preparation 75-66-1P, 2-Propanethiol, 2-methyl- 97-93-8P, Triethylaluminum, preparation 100-63-0P, Phenylhydrazine 102-54-5P, Bis(cyclopentadienyl)iron 506-82-1P, Dimethylcadmium 544-97-8P, Dimethylzinc 546-68-9P, Titanium tetra-isopropoxide 557-20-0P, Diethylzinc 592-02-9P, Diethylcadmium 593-74-8P, Dimethylmercury 593-79-3P, Dimethylselenium 593-88-4P, Trimethylarsenic 593-90-8P, Trimethylborane 594-09-2P, Trimethylphosphorus 594-10-5P, Trimethylantimony 594-27-4P, Tetramethyltin 597-64-8P, Tetraethyltin 617-85-6P, Triethylantimony 627-53-2P, Diethylselenium 822-65-1P, Phenylarsine 865-31-6P, Trimethoxyaluminum 865-37-2P, Dimethylaluminum hydride 923-34-2P, Triethylindium 1115-99-7P, Triethylgallium 1184-58-3P, Dimethylaluminum chloride 1191-15-7P, Di-isobutylaluminum hydride 1284-72-6P, Bis(cyclopentadienyl)magnesium **1314-61-0P**, **Tantalum pentoxide** 1445-79-0P, Trimethylgallium 1586-92-1P, Diethylaluminum ethoxide 2081-12-1P, 2-Propanol, 2-methyl-, zirconium(4+) salt (4:1) 2501-94-2P, t-Butylphosphine 2572-25-0P, Gallium ethoxide 3087-39-6P, 2-Propanol, 2-methyl-, titanium(4+) salt 3236-82-6P, Niobium pentaethoxide 3275-24-9P, Titanium tetradimethylamide 3385-78-2P, Trimethylindium 4419-47-0P, Ethanamine, N-ethyl-, titanium(4+) salt 4731-36-6P, Aluminum, tri-tert-butyl- 6596-96-9P, Tris(dimethylamino)arsenic 7289-92-1P, Tris(dimethylamino)antimony 13463-40-6P, Iron pentacarbonyl 14024-18-1P, Iron tris(acetylacetonate) 14024-63-6P, Zinc bis(acetylacetonate) 14040-05-2P 14363-14-5P 14781-45-4P 14876-47-2P 14951-50-9P 15492-49-6P 15632-39-0P 17150-84-4P, Tri-isobutylgallium 17594-47-7P, Barium bis(2,2,6,6-tetramethylheptanedioate) 18865-74-2P, Zirconium tetra(2,2,6,6-tetramethylheptanedioate) 21319-43-7P 21361-35-3P 22411-22-9P, Hafnium tetrabutoxide 36513-05-0P 36809-75-3P, 2-Propanol, 2-methyl-, tin(4+) salt 36830-74-7P, Strontium bis(2,2,6,6-tetramethylheptanedioate) 39760-34-4P, Arsine,

tris(1,1-dimethylethyl)- 40672-08-0P, Bis(methylcyclopentadienyl)magnesium 51112-72-2P, Diisopropyltellurium 52406-69-6P 52406-81-2P 54514-59-9P, Triisopropylgallium 73300-45-5P, Triisopropylantimony 102091-56-5P, Ethyldimethylindium 119254-23-8P, Vanadium, bis(2-propanolato)oxo- 142617-53-6P **169896-41-7DP**, dimethyltellurium 172901-22-3P 177580-52-8P 177580-53-9P 238757-13-6P 359847-15-7P 368879-34-9P
(purifn. of organometallic compds. by passage through catalyst bed contg. supported palladium and hydrogenated getter alloys)

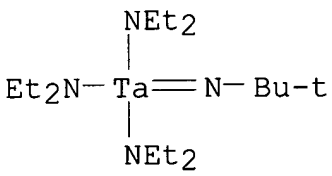
L22 ANSWER 11 OF 14 HCA COPYRIGHT 2006 ACS on STN
135:326030 Process for deposition of oxides and nitrides with compositional gradients. Senzaki, Yoshihide; Norman, John Anthony Thomas; Hochberg, Arthur Kenneth (Air Products and Chemicals, Inc., USA). Eur. Pat. Appl. EP 1146140 A1 **20011017**, 10 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-107778 20010404. PRIORITY: US 2000-546867 20000410.

AB Disclosed is a process for deposition of a multiple metal and metalloid compd. layer with a compositional gradient of the metal and metalloid in the layer on a substrate of an electronic material, comprising: (a) providing .gtoreq.2 metal-ligand and metalloid-ligand complex precursors, wherein the ligands are preferably the same; (b) delivering the precursors to a deposition zone where the substrate is located; (c) contacting the substrate under deposition conditions with the precursors; (d) varying the temp. of deposition from a 1st temp. to a 2nd distinct temp. which is at least 40>C from said 1st temp. during the contact, and (e) depositing a multiple metal and metalloid compd. layer on the substrate from the precursors resulting in the compositional gradient of the metal and metalloid in the layer as a result of step (d). An O source can be added to result in a metal-metalloid oxide, or a N source can be added to result in a metal-metalloid nitride, or a mixt. of an O and a N source can be added to result in a metal-metalloid oxynitride. The metalloid would preferably be Si.

IT **169896-41-7**
(process for deposition of multiple metal and metalloid compd. layer with compositional gradients using solventless mixts. including)

RN 169896-41-7 HCA

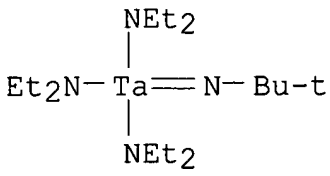
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-02
ICS C23C016-52
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75
IT 99039-55-1P, Tantalum nitride silicide 104365-93-7P, Silicon **tantalum oxide** 132085-96-2P, Zirconium nitride silicide
(process for deposition of multiple metal and metalloid compd. layer with compositional gradients)
IT 1624-01-7 13801-49-5 **169896-41-7**
(process for deposition of multiple metal and metalloid compd. layer with compositional gradients using solventless mixts. including)

L22 ANSWER 12 OF 14 HCA COPYRIGHT 2006 ACS on STN
135:320125 A process for the purification of organometallic compounds or heteroatomic organic compounds with a catalyst based on iron and manganese supported on zeolites. Vergani, Giorgio; Succi, Marco (Saes Getters S.p.A., Italy). PCT Int. Appl. WO 2001079586 A1 **20011025**, 18 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-IT184 20010413. PRIORITY: IT 2000-MI880 20000419; IT 2000-MI893 20000420.
AB A process is described for the purifn. of organometallic compds. or heteroat. org. compds. from oxygen, water and from the compds. deriving from the reaction of water and oxygen with the organometallic or heteroat. compds. whose purifn. is sought, comprising the operation of contacting the organometallic or heteroat. compd. to be purified, in the liq. state or in form of vapor, pure or in a carrier gas, with a catalyst based on iron and manganese supported on zeolites, and optionally also with one or more gas sorber materials selected among hydrogenated getter alloys and palladium deposited on a porous support.
IT **1314-61-0P, Tantalum pentaoxide**

169896-41-7P
(purifn. of organometallic compds. or heteroat. org. compds. with a catalyst based on iron and manganese supported on zeolites)
RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-44
ICS C01B006-34; C01B033-04
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 29, 56, 76
IT 75-24-1P, Trimethylaluminum 75-64-9P, preparation 97-93-8P, Triethylaluminum, preparation 100-63-0P, Phenylhydrazine 102-54-5P, Bis-cyclopentadienyliron 506-82-1P, Dimethylcadmium 544-97-8P, Dimethylzinc 557-20-0P, Diethylzinc 592-02-9P, Diethylcadmium 593-74-8P, Dimethylmercury 593-79-3P, Dimethylselenium 593-80-6P, Dimethyltellurium 593-88-4P, Trimethylarsenic 593-90-8P, Trimethylborane 594-09-2P, Trimethylphosphorus 594-10-5P, Trimethylantimony 594-27-4P, Tetramethyltin 597-64-8P, Tetraethyltin 617-85-6P, Triethylantimony 627-53-2P, Diethylselenium 627-54-3P, Diethyltellurium 822-65-1P, Phenylarsine 865-31-6P, Trimethoxyaluminum 865-37-2P, Dimethylaluminum hydride 871-89-6P, Dibutylaluminum hydride 923-34-2P, Triethylindium 1115-99-7P, Triethylgallium 1184-58-3P, Dimethylaluminum chloride 1284-72-6P, Bis-cyclopentadienylmagnesium **1314-61-0P**, **Tantalum pentaoxide** 1445-79-0P, Trimethylgallium 1586-92-1P, Diethylaluminum ethoxide 1686-23-3P 2081-12-1P, Zirconium tetra-tert-butoxide 2172-02-3P, Hafnium tetra-tert-butoxide 2501-94-2P, t-Butylphosphine 2572-25-0P 3087-37-4P, Titanium tetrapropoxide 3087-39-6P, Titanium tetra-tert-butoxide 3236-82-6P, Niobium pentaethoxide 3275-24-9P, Titanium tetradimethylamide 3385-78-2P, Trimethylindium 4262-43-5P, tert-Butylarsine 4419-47-0P 4731-36-6P, Tri-tert-butylaluminum 6596-96-9P, Tris-dimethylaminoarsenic 7289-92-1P, Tris-dimethylaminoantimony 13463-40-6P, Iron pentacarbonyl 14024-18-1P, Iron trisacetylacetonate 14024-63-6P, Zinc bis-acetylacetonate

14040-05-2P 14319-13-2P 14363-14-5P 14781-45-4P 14876-47-2P
14951-50-9P 15492-49-6P 15632-39-0P 15677-44-8P,
Tributylgallium 17594-47-7P 18865-74-2P 21319-43-7P
21361-35-3P 30260-66-3P, Dimethylhydrazine 36809-75-3P, Tin
tetra-tert-butoxide 36830-74-7P 40672-08-0P,
Bis-methylcyclo-pentadienylmagnesium 51112-72-2P,
Diisopropyltellurium 52406-69-6P 52406-81-2P 54514-59-9P,
Triisopropylgallium 73300-45-5P, Triisopropylantimony
80570-88-3P 102091-56-5P, Ethyldimethylindium 142617-53-6P
169896-41-7P 172901-22-3P 177580-52-8P 177580-53-9P
238757-13-6P 359847-15-7P 368879-34-9P
(purifn. of organometallic compds. or heteroat. org. compds. with a catalyst based on iron and manganese supported on zeolites)

L22 ANSWER 13 OF 14 HCA COPYRIGHT 2006 ACS on STN
134:64030 Metalorganic CVD of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen. Chiu, Hsin-Tien; Wang, Chun-Nan; Chuang, Shiow-Huey (Department of Applied Chemistry, National Chiao Tung University, Hsinchu, 30050, Taiwan). Chemical Vapor Deposition, 6(5), 223-225 Published in: Adv. Mater. (Weinheim, Ger.), 12(19) (English) **2000**. CODEN: CVDEFX. ISSN: 0948-1907. Publisher: Wiley-VCH Verlag GmbH.

AB The results are reported of preliminary exploration of metalorg. CVD of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen. Tert-butylimidotris(diethylamido)tantalum, (TBTDET) with a higher vapor pressure than Ta(OEt)5, and other tantalum alkoxides, can be used as a precursor to grow **tantalum oxide** thin films by CVD for device application. Using this precursor, a **Ta2O5** film with a thickness of 180 nm had a leakage c.d. below 1 .times. 10 -8 A/cm2 for an elec. field strength of 2 MV/cm, and a breakdown voltage of 2 MV/cm. The dielec. const. was 22.

IT **1314-61-0, Tantalum oxide Ta2O5**
(metalorg. CVD and elec. properties of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen for device application)

RN 1314-61-0 HCA

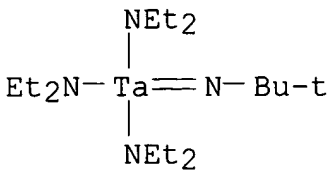
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **169896-41-7**, tert-Butylimidotris(diethylamido)tantalum
(metalorg. CVD and elec. properties of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen for device application)

RN 169896-41-7 HCA

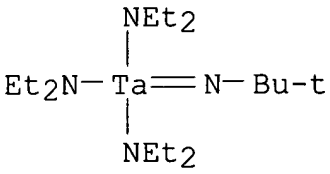
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76
ST metalorg CVD **tantalum oxide**
butylimidotrisdiethylamidotantalum oxygen
IT Dielectric constant
Electric field
Leakage current
Semiconductor devices
(metalorg. CVD and elec. properties of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen for device application)
IT Vapor deposition process
(metalorg.; metalorg. CVD and elec. properties of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen for device application)
IT **1314-61-0, Tantalum oxide Ta2O5**
(metalorg. CVD and elec. properties of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen for device application)
IT 7782-44-7, Oxygen, reactions **169896-41-7**,
tert-Butylimidotris(diethylamido)tantalum
(metalorg. CVD and elec. properties of **tantalum oxide** from tert-butylimidotris(diethylamido)tantalum and oxygen for device application)

L22 ANSWER 14 OF 14 HCA COPYRIGHT 2006 ACS on STN
132:238802 Chemical vapor deposition process and device manufactured by the method. Machida, Hideaki; Higuchi, Noboru; Kokubu, Hiroshi; Funakubo, Hiroshi (Tori Chemical Kenkyusho K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2000087240 A2 **20000328**, 17 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-256867 19980910.
AB The method involves using an org. metal compd. having free groups and performing vapor transport using a carrier gas contg. a compd. having the groups or a compd. having the groups as a carrier gas. A Ca-, Sr-, Ba-, Pb-, Ta-, Cu-, Ti-, Zr-, and Al-based film are manufd. by the method. Stable vapor transport is performed in the CVD process with decompn. prevention of the compd.
IT **1314-61-0P, Tantalum oxide (Ta2O5)**

(film formation by CVD for dielec. devices)
RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **169896-41-7**
(film formation by CVD for dielec. devices)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-18
ICS C01G029-00; C23C016-34; C23C016-40; C23C016-448
CC 47-7 (Apparatus and Plant Equipment)
Section cross-reference(s): 57, 75, 76
IT 1304-28-5P, Barium oxide, uses 1305-78-8P, Calcium oxide, uses 1314-11-0P, Strontium oxide, uses 1314-23-4P, Zirconia, uses **1314-61-0P, Tantalum oxide** (**Ta2O5**) 1317-36-8P, Lead oxide (PbO), uses 7440-50-8P, Copper, uses 12033-62-4P, Tantalum nitride (TaN) 12058-38-7P, Tungsten nitride (WN) 12673-59-5P, Niobium Strontium oxide 25583-20-4P, Titanium nitride (TiN) 39427-01-5P, Aluminum copper oxide 106603-81-0P, Strontium **tantalum oxide**
(film formation by CVD for dielec. devices)
IT 64-17-5, Ethanol, processes 75-04-7, Monoethyl amine, processes 75-64-9, tert-Butylamine, processes 109-89-7, processes 112-24-3 112-57-2, Tetraethylene pentamine 124-40-3, Dimethylamine, processes 598-56-1 754-05-2, Trimethylvinyl silane 1118-71-4 3236-82-6 3275-24-9 6074-84-6 7784-21-6, Aluminum hydride 14781-45-4, Bis(hexafluoroacetylacetonato copper) 16761-83-4 17594-47-7, Bis(Dipivaloylmethanato barium) 36830-74-7, Bis(Dipivaloylmethanato strontium) 55161-66-5 59196-92-8 61156-35-2 67313-80-8 118448-18-3, Bis(Dipivaloylmethanato calcium) 150178-00-0, Bis(Dipivaloylmethanato lead) **169896-41-7** 184675-46-5 261929-98-0
(film formation by CVD for dielec. devices)

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L23 ANSWER 1 OF 3 HCA COPYRIGHT 2006 ACS on STN
139:234012 Synthesis of metal oxide and oxynitride by low pressure CVD

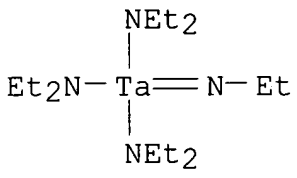
technique in semiconductor device fabrication. Senzaki, Yoshihide; Hochberg, Arthur Kenneth; Cuthill, Kirk Scott (Air Products and Chemicals, Inc., USA). U.S. US 6616972 B1 20030909, 6 pp. (English). CODEN: USXXAM. APPLICATION: US 1999-256933 19990224.

AB A method for producing a material selected from metal oxide, metal oxynitride, and mixts. thereof on a substrate comprises reacting a first reactant selected from (R1R2N)xM(=NR3)y, (R4R5N)xM[.eta.2-R6N=C (R7)(R8)]y and mixts. thereof with an oxidant and up to 95 vol.% of a source of nitrogen selected from ammonia, N2O, NO, NO2, alkyl amines, N2H2, alkyl hydrazine, N2, and mixts. thereof, to produce said material on said substrate, where R1, R2, R3, R4, R5, R6, R7 and R8 are individually C1-6 alkyl, aryl or hydrogen, M is Ta, Nb, W, or Mo, or mixts. thereof, whereby x = 3 and y = 1 when M is Ta or Nb, and y = x = 2 when M is W or Mo. The method is suitable in the manuf. of **tantalum oxide**, tantalum nitride, and tantalum oxynitride ultrathin films onto silicon wafers.

IT **67313-80-8**
(precursor; synthesis of metal oxide and oxynitride by low pressure CVD technique in semiconductor device fabrication)

RN 67313-80-8 HCA

CN Tantalum, [ethanaminato(2-)]tris(N-ethylethanaminato)-, (T-4)- (9CI) (CA INDEX NAME)



IT **59763-75-6, Tantalum oxide**
(ultrathin film synthesized on Si wafer; synthesis of metal oxide and oxynitride by low pressure CVD technique in semiconductor device fabrication)

RN 59763-75-6 HCA

CN Tantalum oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Ta	x	7440-25-7

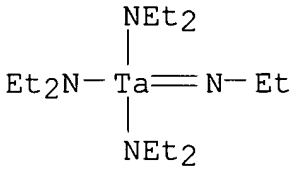
IC ICM C23C016-18

INCL 427255310; 427255394; 438785000

CC 57-2 (Ceramics)
Section cross-reference(s): 76, 78

IT 67296-24-6 **67313-80-8**
(precursor; synthesis of metal oxide and oxynitride by low pressure CVD technique in semiconductor device fabrication)
IT 12033-62-4, Tantalum nitride 52036-92-7, Tantalum oxynitride **59763-75-6, Tantalum oxide**
(ultrathin film synthesized on Si wafer; synthesis of metal oxide and oxynitride by low pressure CVD technique in semiconductor device fabrication)

L23 ANSWER 2 OF 3 HCA COPYRIGHT 2006 ACS on STN
137:26814 Film formation by metalorganic chemical vapor deposition.
Ogura, Atsushi (Nec Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002167672 A2 **20020611**, 6 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2000-364056 20001130.
AB The method involves (1) introducing .gtoreq.1 kinds of M[NEt2]4 (M = metal involving Si) into a reactor, (2) chem. vapor depositing metal (involving alloys) or metal compd. films, and (3) heating at a higher temp. than the deposition temp. Metal, metal oxide, or metal nitride films are obtained on uneven surfaces of electronic or semiconductor devices with good controllability and uniformity.
IT **67313-80-8**
(MOCVD of metal, oxide, or nitride films using diethylamine compds. on uneven substrates)
RN 67313-80-8 HCA
CN Tantalum, [ethanaminato(2-)]tris(N-ethylethanaminato)-, (T-4)- (9CI) (CA INDEX NAME)



IT **1314-61-0P, Tantalum oxide**
(MOCVD of metal, oxide, or nitride films using diethylamine compds. on uneven substrates)
RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM C23C016-18
ICS C23C016-34; C23C016-40; H01L021-285; H01L021-316
CC 76-3 (Electric Phenomena)
IT 4419-47-0, Tetrakis(diethylamino)titanium 7664-41-7, Ammonia, processes 7727-37-9, Nitrogen, processes 7732-18-5, Water, processes 7782-44-7, Oxygen, processes 10024-97-2, Nitrogen oxide (N2O), processes 10102-43-9, Nitrogen oxide (NO), processes 13801-49-5, Tetrakis(diethylamino)zirconium 17048-10-1

19824-55-6, Tetrakis(diethylamino)hafnium **67313-80-8**
98145-63-2
(MOCVD of metal, oxide, or nitride films using diethylamine compds. on uneven substrates)

IT **1314-61-0P, Tantalum oxide** 7440-25-7P, Tantalum, processes 12033-62-4P, Tantalum nitride
(MOCVD of metal, oxide, or nitride films using diethylamine compds. on uneven substrates)

L23 ANSWER 3 OF 3 HCA COPYRIGHT 2006 ACS on STN
133:289409 MOCVD of high-K dielectrics and conductive metal nitride thin films. Senzaki, Yoshihide; Hamilton, Richard F.; Reid, Kimberly G.; Hobbs, Christopher C.; Hegde, Rama I.; Tiner, Mike J. (Schumacher, Carlsbad, CA, 92009, USA). Materials Research Society Symposium Proceedings, 606(Chemical Processing of Dielectrics, Insulators and Electronic Ceramics), 13-22 (English) **2000**. CODEN: MRSPDH. ISSN: 0272-9172. Publisher: Materials Research Society.

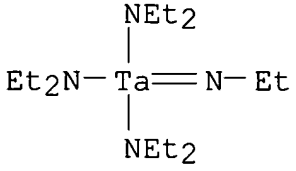
AB A known liq. mixt. of [(CH3CH2)2N]3Ta=NCH2CH3 and [(CH3CH2)2N]3Ta[.eta.2-CH3CH2N=CH(CH3)] was studied to deposit **Ta2O5** and TaN thin films by CVD. Films were deposited at temps. below 400.degree.C using oxygen for oxide and ammonia for nitride, resp. XRD anal. revealed that as-deposited amorphous **tantalum oxide** films were converted to hexagonal **Ta2O5** after annealing under oxygen, while tantalum nitride thin films contained cubic TaN as deposited. The low viscosity, thermal stability, and sufficient volatility of the precursor allows direct liq. injection to deliver the precursor, which results in high deposition rate and uniformity of the deposited films.

IT **1314-61-0, Tantalum pentoxide**
(MOCVD of high-K dielecs. and conductive metal nitride thin films)

RN 1314-61-0 HCA
CN Tantalum oxide (Ta2O5) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **67313-80-8**
(MOCVD of high-K dielecs. and conductive metal nitride thin films)

RN 67313-80-8 HCA
CN Tantalum, [ethanaminato(2-)]tris(N-ethylethanaminato)-, (T-4)- (9CI) (CA INDEX NAME)



CC 76-3 (Electric Phenomena)
Section cross-reference(s): 75
ST MOCVD **tantalum oxide** nitride film
IT **1314-61-0, Tantalum pentoxide**
12033-62-4, Tantalum nitride TaN
(MOCVD of high-K dielecs. and conductive metal nitride thin films)
IT 67296-24-6 **67313-80-8** 300408-20-2
(MOCVD of high-K dielecs. and conductive metal nitride thin films)

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L33 3 S L32 AND 1840-2002/PY,PRY

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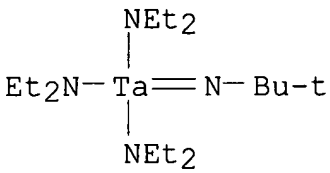
L30 ANSWER 1 OF 4 HCA COPYRIGHT 2006 ACS on STN
135:320126 A process for the purification of organometallic compounds or heteroatomic organic compounds with hydrogenated getter alloys. Vergani, Giorgio; Succi, Marco (Saes Getters S.p.A., Italy). PCT Int. Appl. WO 2001079587 A1 **20011025**, 20 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-IT185 20010413. PRIORITY: IT 2000-MI882 20000419; IT 2000-MI892 20000420.

AB A process for the purifn. of organometallic compds. or heteroat. org. compds. from oxygen, water and from the compds. deriving from the reaction of water and oxygen with the organometallic or heteroat. compds. whose purifn. is sought, comprising the operation of contacting the organometallic or heteroat. compd. to the purified in the liq. state or in form of vapor, pure or in a carrier gas, with a hydrogenated getter alloy, and optionally also with one or more gas sorber materials selected among palladium on porous supports and a mixt. of iron and manganese supported on zeolites.

IT **169896-41-7P**
(purifn. of organometallic compds. or heteroat. org. compds. with hydrogenated getter alloys)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IT **7782-44-7, Oxygen, processes**
(purifn. of organometallic compds. or heteroat. org. compds. with hydrogenated getter alloys)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

IC ICM C23C016-44
ICS C01B006-34; C01B033-04

CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 29, 56, 76

IT 75-24-1P, Trimethylaluminum 75-64-9P, tert-Butylamine, preparation 75-66-1P, tert-Butylmercaptan 97-93-8P, Triethylaluminum, preparation 100-63-0P, Phenylhydrazine 102-54-5P, Ferrocene 506-82-1P, Dimethylcadmium 544-97-8P, Dimethylzinc 557-20-0P, Diethylzinc 592-02-9P, Diethylcadmium 593-74-8P, Dimethylmercury 593-79-3P, Dimethylselenium 593-80-6P, Dimethyltellurium 593-88-4P, Trimethylarsenic 593-90-8P, Trimethylborane 594-09-2P, Trimethylphosphorus 594-10-5P, Trimethylantimony 594-27-4P, Tetramethyltin 597-64-8P, Tetraethyltin 617-85-6P, Triethylantimony 627-53-2P, Diethylselenium 627-54-3P, Diethyltellurium 822-65-1P, Phenylarsine 865-37-2P, Dimethylaluminum hydride 923-34-2P, Triethylindium 1115-99-7P,

Triethylgallium 1184-58-3P, Dimethylaluminum chloride 1191-15-7P, Diisobutylaluminum hydride 1284-72-6P, Magnesocene 1445-79-0P, Trimethylgallium 1586-92-1P, Diethylaluminum ethoxide 2172-02-3P, Hafnium tetra-tert-butoxide 2501-94-2P, tert-Butylphosphine 3275-24-9P, Titanium tetradimethylamide 3385-78-2P, Trimethylindium 4262-43-5P, tert-Butylarsine 4419-47-0P 4731-36-6P, Tri-tert-butylaluminum 6596-96-9P, Tris-dimethylaminoarsenic 7289-92-1P, Tris-dimethylaminoantimony 13463-40-6P, Iron pentacarbonyl 14024-18-1P, Iron trisacetylacetonate 14024-63-6P, Zinc bis-acetylacetonate 14040-05-2P, Copper, bis(2,2,6,6-tetramethyl-3,5-heptanedionato) 14319-13-2P, Lanthanum, tris(2,2,6,6-tetramethyl-3,5-heptanedionato-.kappa.O,.kappa.O')-, (OC-6-11)- 14363-14-5P, Zinc, bis(2,2,6,6-tetramethyl-3,5-heptanedionato) 14781-45-4P 14876-47-2P, Iron, tris(2,2,6,6-tetramethyl-3,5-heptanedionato-.kappa.O,.kappa.O')-, (OC-6-11)- 14951-50-9P 15492-49-6P, Scandium, tris(2,2,6,6-tetramethyl-3,5-heptanedionato-.kappa.O,.kappa.O')-, (OC-6-11)- 15632-39-0P, Yttrium tris(2,2,6,6-tetramethyl-3,5-heptanedionate) 17150-84-4P, Triisobutylgallium 17594-47-7P, Barium bis(2,2,6,6-tetramethyl-3,5-heptanedionate) 18865-74-2P 21319-43-7P, Lead, bis(2,2,6,6-tetramethyl-3,5-heptanedionato) 21361-35-3P, Magnesium, bis(2,2,6,6-tetramethyl-3,5-heptanedionato) 30260-66-3P, Dimethylhydrazine 36830-74-7P, Strontium, bis(2,2,6,6-tetramethyl-3,5-heptanedionato) 40672-08-0P, Magnesium bis-methylcyclopentadienyl 51112-72-2P, Diisopropyltellurium 54514-59-9P, Triisopropylgallium 73300-45-5P, Triisopropylantimony 80570-88-3P 102091-56-5P, Ethyldimethylindium 142617-53-6P **169896-41-7P** 177580-52-8P 177580-53-9P 238757-13-6P, Tantalum, tetramethoxy(2,2,6,6-tetramethyl-3,5-heptanedionato-.kappa.O,.kappa.O')-, (OC-6-22)- 368879-34-9P
(purifn. of organometallic compds. or heteroat. org. compds. with hydrogenated getter alloys)

IT 7732-18-5, Water, processes **7782-44-7, Oxygen, processes**
(purifn. of organometallic compds. or heteroat. org. compds. with hydrogenated getter alloys)

L30 ANSWER 2 OF 4 HCA COPYRIGHT 2006 ACS on STN

135:311268 Liquid precursor mixtures for deposition of multicomponent metal containing materials. Senzaki, Yoshihide; Roberts, David Allen; Norman, John Anthony Thomas; Hochberg, Arthur Kenneth (Air Products and Chemicals, Inc., USA). Eur. Pat. Appl. EP 1146141 A2 **20011017**, 9 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-107777 20010404. PRIORITY: US 2000-546452 20000410.

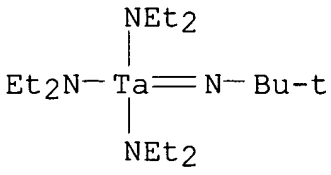
AB The present invention is a compn. for deposition of a mixed metal or

metal compd. layer, comprising a solventless mixt. of at least 2 metal-ligand complex precursors, wherein the mixt. is liq. at ambient conditions and the ligands are the same and are selected from the group consisting of alkyls, alkoxides, halides, hydrides, amides, imides, azides cyclopentadienyls, carbonyls, and their fluorine, oxygen and nitrogen substituted analogs. The present invention is also a process for deposition of a multiple metal or metal compd. layer on a substrate of an electronic material, comprising: (a) providing a solventless mixt. of .gtoreq.2 metal-ligand complex precursors which constitute a liq. at ambient conditions, wherein the ligands are the same and are selected from the group consisting of alkyls, alkoxides, halides, hydrides, amides, imides, azides, nitrates, cyclopentadienyls, carbonyls, pyrazoles, and their fluorine, oxygen and nitrogen substituted analogs; (b) delivering the solventless mixt. by direct liq. injection to a flash vaporization zone to vaporize the solventless mixt.; (c) contacting the substrate under deposition conditions with a resulting vapor of the solventless mixt., and (c) depositing a multiple metal or metal compd. layer on the substrate from the solventless mixt.

IT **7782-44-7, Oxygen, processes**
169896-41-7
(deposition of multicomponent metal contg. materials using liq. precursor mixts. including)

RN 7782-44-7 HCA
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-40
ICS C23C016-34

CC 75-1 (Crystallography and Liquid Crystals)

IT **Air**
(deposition of multicomponent metal contg. materials using liq. precursor mixts. including)

IT 302-01-2, Hydrazine, processes 555-75-9 1066-77-9 2081-12-1

3087-39-6 3275-24-9 4419-47-0 6074-84-6 7429-90-5D, Aluminum, complexes, processes 7439-88-5D, Iridium, complexes, processes 7439-89-6D, Iron, complexes, processes 7439-91-0D, Lanthanum, complexes, processes 7439-92-1D, Lead, complexes, processes 7439-93-2D, Lithium, complexes, processes 7439-95-4D, Magnesium, complexes, processes 7439-96-5D, Manganese, complexes, processes 7439-97-6D, Mercury, complexes, processes 7439-98-7D, Molybdenum, complexes, processes 7440-02-0D, Nickel, complexes, processes 7440-03-1D, Niobium, complexes, processes 7440-04-2D, Osmium, complexes, processes 7440-05-3D, Palladium, complexes, processes 7440-06-4D, Platinum, complexes, processes 7440-09-7D, Potassium, complexes, processes 7440-15-5D, Rhenium, complexes, processes 7440-16-6D, Rhodium, complexes, processes 7440-17-7D, Rubidium, complexes, processes 7440-18-8D, Ruthenium, complexes, processes 7440-20-2D, Scandium, complexes, processes 7440-21-3D, Silicon, complexes, processes 7440-22-4D, Silver, complexes, processes 7440-23-5D, Sodium, complexes, processes 7440-24-6D, Strontium, complexes, processes 7440-25-7D, Tantalum, complexes, processes 7440-26-8D, Technetium, complexes, processes 7440-28-0D, Thallium, complexes, processes 7440-31-5D, Tin, complexes, processes 7440-32-6D, Titanium, complexes, processes 7440-33-7D, Tungsten, complexes, processes 7440-36-0D, Antimony, complexes, processes 7440-39-3D, Barium, complexes, processes 7440-41-7D, Beryllium, complexes, processes 7440-43-9D, Cadmium, complexes, processes 7440-45-1D, Cerium, complexes, processes 7440-46-2D, Cesium, complexes, processes 7440-47-3D, Chromium, complexes, processes 7440-48-4D, Cobalt, complexes, processes 7440-50-8D, Copper, complexes, processes 7440-55-3D, Gallium, complexes, processes 7440-56-4D, Germanium, complexes, processes 7440-57-5D, Gold, complexes, processes 7440-58-6D, Hafnium, complexes, processes 7440-62-2D, Vanadium, complexes, processes 7440-65-5D, Yttrium, complexes, processes 7440-66-6D, Zinc, complexes, processes 7440-67-7D, Zirconium, complexes, processes 7440-69-9D, Bismuth, complexes, processes 7440-70-2D, Calcium, complexes, processes 7440-74-6D, Indium, complexes, processes 7664-41-7, Ammonia, processes 7722-84-1, Hydrogen peroxide, processes 7727-37-9, Nitrogen, processes 7732-18-5, Water, processes **7782-44-7, Oxygen, processes** 7782-79-8, Hydrogen azide 10024-97-2, Nitrous oxide, processes 10028-15-6, Ozone, processes 10102-43-9, Nitric oxide, processes 10102-44-0, Nitrogen dioxide, processes 13801-49-5 17048-10-1 19756-04-8 19824-55-6 19824-57-8 19824-59-0 19824-60-3 21941-96-8 25169-05-5 36809-75-3 62029-51-0 67313-80-8 70599-04-1 **169896-41-7** 318277-05-3 318277-06-4 318277-07-5

(deposition of multicomponent metal contg. materials using liq. precursor mixts. including)

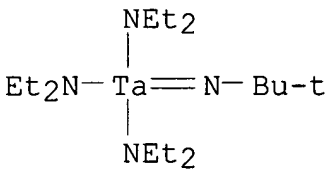
L30 ANSWER 3 OF 4 HCA COPYRIGHT 2006 ACS on STN
134:374200 Plasma-enhanced atomic layer deposition of tantalum nitrides using hydrogen radicals as a reducing agent. Park, Jin-Seong; Lee, Min-Jung; Lee, Choon-Soo; Kang, Sang-Won (Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Taejon, S. Korea). Electrochemical and Solid-State Letters, 4(4), C17-C19 (English) **2001**. CODEN: ESLEF6. ISSN: 1099-0062. Publisher: Electrochemical Society.

AB Plasma-enhanced at. layer deposition (PEALD) of Ta nitride (Ta-N) thin films at a deposition temp. of 260.degree. using H radicals as a reducing agent for tert-butylimidotris(diethylamido)tantalum is described. The PEALD yielded superior Ta-N films with an elec. resistivity of 400 .mu..OMEGA. cm and no aging effect under exposure to **air**. The film d. was higher than that of Ta-N films formed by typical ALD, in which NH3 was used instead of H radicals. In addn., the as-deposited films were not amorphous, but rather polycryst. structures of cubic TaN. The d. and crystallinity of the films increased with the pulse time of H plasma. The films were Ta-rich in compn. and contain around 15 at. % of C impurity.

IT **169896-41-7**, Tertbutylimidotris(diethylamido)tantalum
(plasma-enhanced at. layer deposition of tantalum nitride using hydrogen radicals as reducing agent for)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76

IT **169896-41-7**, Tertbutylimidotris(diethylamido)tantalum
(plasma-enhanced at. layer deposition of tantalum nitride using hydrogen radicals as reducing agent for)

L30 ANSWER 4 OF 4 HCA COPYRIGHT 2006 ACS on STN
134:50100 Method of fabricating semiconductor device employing copper interconnect structure. Kim, Ki-Bum (S. Korea). PCT Int. Appl. WO 2000075964 A2 **20001214**, 20 pp. DESIGNATED STATES: W: JP, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1999-KR847 19991230. PRIORITY: KR 1999-20828 19990605.

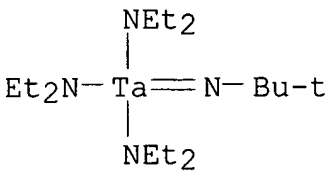
AB The high-reliability Cu interconnect has been formed in a process for fabricating semiconductor device. The copper interconnect

structure comprises of TiN layer and intermediate Al layer as a diffusion barrier. A Cu layer is deposited on the Al layer, after Al layer is deposited on the TiN layer. With the Al layer being made to the min. thickness, metalization is formed substantially with the Cu.

IT **169896-41-7**, Tertbutylimidotrisdiethylamido tantalum
(fabricating semiconductor device employing copper interconnect structure with TiN layer and Al diffusion barrier layer)

RN 169896-41-7 HCA

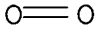
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IT **7782-44-7, Oxygen, processes**
(stuffing the grain boundaries; fabricating semiconductor device employing copper interconnect structure with TiN layer and Al diffusion barrier layer)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IC ICM H01L

CC 76-3 (Electric Phenomena)
Section cross-reference(s): 75

IT 3275-24-9, Tetrakisdimethylamido titanium 4419-47-0, Tetrakisdiethylamido titanium 7550-45-0, Titanium chloride (TiCl4), processes 7664-41-7, Ammonia, processes 7720-83-4, Titanium iodide (TiI4) 7721-01-9, Tantalum chloride (TaCl5) 7783-82-6, Tungsten fluoride (WF6) 13451-11-1, Tantalum bromide (TaBr5) 19824-59-0 55161-66-5, Pentakis(diethylamido)tantalum **169896-41-7**, Tertbutylimidotrisdiethylamido tantalum
(fabricating semiconductor device employing copper interconnect structure with TiN layer and Al diffusion barrier layer)

IT 7727-37-9, Nitrogen, processes **7782-44-7, Oxygen, processes**
(stuffing the grain boundaries; fabricating semiconductor device employing copper interconnect structure with TiN layer and Al diffusion barrier layer)

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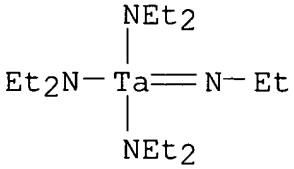
L33 ANSWER 1 OF 3 HCA COPYRIGHT 2006 ACS on STN
137:331742 LPCVD of TaCN thin film for barrier layer in Cu interconnection. Hoshino, A.; Suzuki, T.; Hiiro, S.; Machida, H.; Ogura, A.; Ohshita, Y. (Technical + Development Department, TRI Chemical Laboratory Inc., Uenohara-machi, Kitatsuru-gun, Yamanashi, 409-0112, Japan). Advanced Metallization Conference 2000, Proceedings of the Conference, San Diego, CA, United States, Oct. 2-5 and University of Tokyo, Tokyo, Japan, Oct. 19-20, 2000, 403-408. Editor(s): Edelstein, Dan. Materials Research Society: Warrendale, Pa. ISBN: 1-55899-574-9 (English) **2000**. CODEN: 69CXY4.

AB We synthesized a mixt. of EtN:Ta(NEt2)3 and Ta(NEt2)4 as a precursor for Ta carbonitride CVD and investigated its properties. The vapor pressure is slightly low in comparison with TDMAT, and appropriate for CVD precursor (7 torr at 60.degree.). This precursor is relatively safety because it is not pyrophoric in **air**. Moreover, purifn. is easy because it is liq., so can be distd. Using this precursor, we deposited Ta carbonitride thin film by low-pressure CVD. Depositions were successfully carried out at 375-500.degree. using H2 carrier gas. Below 400.degree., excellent step coverage was achieved, because the surface reaction was dominant. However, the film resistivity increased with decreasing substrate temp. To obtain low resistivity of film deposited at a lower temp., we increased the amt. of H2 gas injected during deposition. The resistivity decreased with increasing H2 gas flow rate, and injecting a large amt. of H2 gas was found to be an effective method of obtaining both low resistivity and high quality step coverage. The concns. of C and N in the film were measured: C > 10%, N < 1%. Microstructural observation by TEM revealed that the deposited film was an amorphous phase. Finally, we prepd. CVD-Cu/CVD-Ta carbonitride/Si structure film, and after thermal treatment (500.degree. for 30 min.), Cu did not diffuse into the Si layer. Thus, this Ta carbonitride film had good barrier properties.

IT **67313-80-8**
(precursor; LPCVD of TaCN thin film for barrier layer in Cu interconnections)

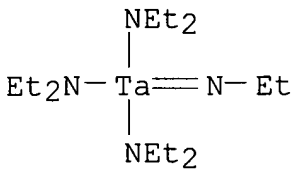
RN 67313-80-8 HCA

CN Tantalum, [ethanaminato(2-)]tris(N-ethylethanaminato)-, (T-4)- (9CI) (CA INDEX NAME)



CC 76-14 (Electric Phenomena)
Section cross-reference(s): 75
IT **67313-80-8** 98145-63-2, Tetrakis(diethylamido)Tantalum
(precursor; LPCVD of TaCN thin film for barrier layer in Cu interconnections)

L33 ANSWER 2 OF 3 HCA COPYRIGHT 2006 ACS on STN
137:208624 MOCVD precursors for Ta- and Hf-compound films. Machida, H.; Hoshino, A.; Suzuki, T.; Ogura, A.; Ohshita, Y. (TRI Chemical Laboratory, Inc., Kitatsurugun, Yamanashi, 409-0112, Japan). Journal of Crystal Growth, 237-239(Pt. 1), 586-590 (English) **2002**. CODEN: JCRGAE. ISSN: 0022-0248. Publisher: Elsevier Science B.V..
AB We synthesized diethylamido Ta (EtN:Ta(NEt2)3+Ta(NEt2)4) and diethylamido Hf (Hf(NEt2)4), using nearly identical methods, as precursors for Ta- and Hf-compd. films. Both precursors were liq. at room temp. and had vapor pressure (Ta: 6 Torr at 60.degree., Hf: 7.5 Torr at 80.degree.) moderate enough for CVD. We deposited TaN thin films from diethylamido Ta and HfO2 thin films from Hf(NEt2)4/ **O2** using MOCVD. The TaN films were amorphous and the HfO2 films were polycryst. Both types had good-quality step coverage.
IT **67313-80-8**
(diethylamino MOCVD precursors for amorphous TaN and polycryst. HfO2 films)
RN 67313-80-8 HCA
CN Tantalum, [ethanaminato(2-)]tris(N-ethylethanaminato)-, (T-4)- (9CI) (CA INDEX NAME)



CC 75-1 (Crystallography and Liquid Crystals)
IT 19824-55-6, Tetrakis(diethylamino)hafnium **67313-80-8**
98145-63-2, Ethanamine, N-ethyl-, tantalum(4+) salt
(diethylamino MOCVD precursors for amorphous TaN and polycryst. HfO2 films)

L33 ANSWER 3 OF 3 HCA COPYRIGHT 2006 ACS on STN
134:94293 Liquid precursor mixtures for deposition of multicomponent metal containing electronic materials. Senzaki, Yoshihide; Roberts, David Allen; Norman, John Anthony Thomas (Air Products and Chemicals, Inc., USA). Eur. Pat. Appl. EP 1067595 A2 **20010110**, 8 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK,

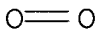
ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2000-114321 20000704. PRIORITY: US 1999-350074 19990708.

AB The process for deposition of a multiple metal or metal compd. layer on a substrate of an electronic material comprises providing a solventless mixt. of .gtoreq.2 metal-ligand complex precursors which constitute a liq. at ambient conditions, in which the ligands are the same and are selected from the group consisting of alkyls, alkoxides, halides, hydrides, amides, imides, azides, nitrates, cyclopentadienyls, carbonyls, and their F, O and N substituted analogs. The solventless mixt. are delivered by direct liq. injection to a flash vaporization zone to vaporize the solventless mixt., and a resulting vapor of the solventless mixt. is contacted with a substrate under deposition conditions to deposit a multiple metal or metal compd. layer on the substrate. Alternatively, the solventless mixt. is delivered to a deposition zone where a substrate is located; and the substrate under deposition conditions is contacted with the solventless mixt. to deposit a multiple metal or metal compd. layer on the substrate. The contacting process on the substrate is selected from the group consisting of chem. vapor deposition, spray pyrolysis, sol-gel processing, spin coating, and at. layer epitaxy.

IT **7782-44-7, Oxygen, processes**
(deposition **oxygen source**; liq. precursor mixts. for deposition of multicomponent metal contg. electronic materials)

RN 7782-44-7 HCA

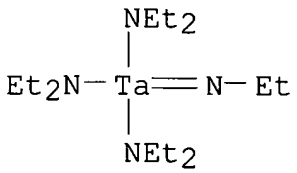
CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IT **67313-80-8**
(liq. precursor mixts. for deposition of multicomponent metal contg. electronic materials)

RN 67313-80-8 HCA

CN Tantalum, [ethanaminato(2-)]tris(N-ethylethanaminato)-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-288

CC 76-3 (Electric Phenomena)

Section cross-reference(s): 75

IT **Air**
(**oxygen source**; liq. precursor mixts. for deposition of multicomponent metal contg. electronic materials)

IT 7722-84-1, Hydrogen peroxide, **processes** 7732-18-5, Water, **processes** **7782-44-7**, **Oxygen**, **processes** 10024-97-2, Nitrous oxide, **processes** 10028-15-6, Ozone, **processes** 10102-43-9, Nitric oxide, **processes** 10102-44-0, Nitrogen dioxide, **processes**
(deposition **oxygen source**; liq. precursor mixts. for deposition of multicomponent metal contg. electronic materials)

IT 555-75-9 1066-77-9 1071-76-7 1624-01-7 3275-24-9 4419-47-0 5593-70-4 6074-84-6 13801-49-5 14254-05-8 19756-04-8 19824-55-6 19824-57-8 19824-59-0 19824-60-3 21941-96-8 25169-05-5 62029-51-0 **67313-80-8** 70599-04-1 318277-05-3 318277-06-4 318277-07-5
(liq. precursor mixts. for deposition of multicomponent metal contg. electronic materials)

(may or may not be) useable

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L24 ANSWER 1 OF 15 HCA COPYRIGHT 2006 ACS on STN

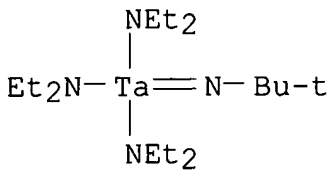
140:341275 **CVD** apparatus. Ishizaka, Tadao; Kanan, Hiroshi; Kojima, Yasuhiko; Shigeoka, Takashi; Oshima, Yasuhiro; Kawamura, Gohei (Tokyo Electron, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2004124193 A2 20040422, 20 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-291578 20021003.

AB An app. for treating a substrate by alternately supplying first and second source gasses to the substrate comprises a treating container contg. the substrate, a first system for supplying the first source gas to the container, a second system for supplying the second source gas to the container, a first exhaust system for removing the first source gas from the container, a second exhaust system for removing the second source gas from the container, a means of switching the first and second supply systems, a means of switching the first and second exhaust systems, and a means of controlling the switching means to prevent the source gasses from reacting in the exhaust systems. The app. is useful for **CVD** of a TiN or TaN film.

IT **169896-41-7**
(gas-supply and exhaust systems of **CVD** app.)

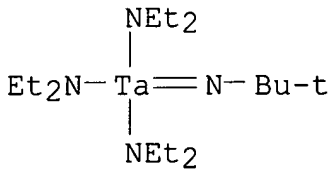
RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



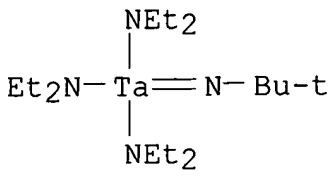
IC ICM C23C016-455
ICS H01L021-31
CC 47-7 (Apparatus and Plant Equipment)
ST **CVD** app
IT Vapor deposition apparatus
(ALD; gas-supply and exhaust systems of **CVD** app.)
IT 12033-62-4, Tantalum nitride (TaN) 25583-20-4, Titanium nitride (TiN)
(gas-supply and exhaust systems of **CVD** app.)
IT 60-34-4, Methylhydrazine 302-01-2, Hydrazine, uses 3275-24-9 4419-47-0 7440-37-1, Argon, uses 7440-59-7, Helium, uses 7550-45-0, Titanium tetrachloride, uses 7664-41-7, Ammonia, uses 7720-83-4, Titanium tetraiodide 7721-01-9, Tantalum pentachloride 7727-37-9, Nitrogen, uses 7783-63-3, Titanium tetrafluoride 7783-71-3, Tantalum pentafluoride 7789-68-6, Titanium tetrabromide 13451-11-1, Tantalum pentabromide 14693-81-3, Tantalum pentaiodide 17000-01-0, Dimethylammonium **169896-41-7** 175923-03-2
(gas-supply and exhaust systems of **CVD** app.)

L24 ANSWER 2 OF 15 HCA COPYRIGHT 2006 ACS on STN
140:278757 Atomic layer deposition with improved deposition rate. Shigeoka, Takashi; Ishizaka, Tadao; Oshima, Yasuhiro; Kojima, Yasuhiko; Kawamura, Gohei (Tokyo Electron, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2004091874 A2 20040325, 20 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-256085 20020830.
AB In the process, two **CVD** source gases reactive to each other are alternately supplied to substrates with the former-supplied source mols. (A) remained in the chambers to have certain partial pressure (e.g., .ltoreq.1.0 Pa) so that the as-adsorbed at. layers can react with A in atm., in addn. to the layers beneath them.
IT **169896-41-7**, tert-Butylimidotris(diethylamido)tantalum
(source; at. layer deposition allowing reaction of as-adsorbed mols. with layers beneath them and with source mols. in atm.)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-455
ICS C23C016-52; H01L021-285; H01L021-316
CC 75-1 (Crystallography and Liquid Crystals)
ST atomic layer deposition both side interlayer reaction; throughput atomic layer **CVD** titanium nitride deposition
IT 75-24-1, Trimethylaluminum 1590-87-0, Disilane 2081-12-1, Tetrakis(tert-butoxy)zirconium 3275-24-9, Tetrakis(dimethylamino)titanium 4109-96-0, Dichlorosilane 4419-47-0, Tetrakis(diethylamino)titanium 6074-84-6, Tantalum pentaethoxide 7550-45-0, Tetrachlorotitanium, processes 7664-41-7, Ammonia, processes 7720-83-4, Tetraiodotitanium 7721-01-9, Tantalum pentachloride 7732-18-5, Water, processes 7782-44-7, Oxygen, processes 7783-63-3, Titanium tetrafluoride 7783-71-3, Tantalum pentafluoride 7789-68-6, Tetrabromotitanium 7803-62-5, Silane, processes 10026-04-7, Tetrachlorosilane 10026-11-6, Zirconium tetrachloride 13451-11-1, Tantalum pentabromide 14693-81-3, Tantalum pentaiodide 19141-69-6, Tetrakis(dipropylamino)titanium **169896-41-7**, tert-Butylimidotris(diethylamido)tantalum
(source; at. layer deposition allowing reaction of as-adsorbed mols. with layers beneath them and with source mols. in atm.)

L24 ANSWER 3 OF 15 HCA COPYRIGHT 2006 ACS on STN
140:21454 Tantalum complexes solutions for metalorganic **chemical vapor deposition** and their tantalum-containing thin films. Itsuki, Atsushi; Ogi, Katsumi (Mitsubishi Materials Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2003342732 A2 20031203, 15 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-144849 20020520.
AB The solns. comprise org. solvents and Ta complexes represented by (Et2N)3Ta:NR (R = iso-Pr, tert-Bu, Bu, iso-Bu, tert-amyl, isoamyl). The solns. vaporize uniformly and stably, provide high-purity Ta-contg. thin films having high barrier property, useful for underlayer for Cu thin films, at high deposition rate.
IT **169896-41-7**
(Ta complexes solns. for metalorg. **chem. vapor deposition** and their Ta-contg. thin films)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-34
ICS C07C211-65; C07F009-00; H01L021-28; H01L021-285
CC 75-1 (Crystallography and Liquid Crystals)
ST metalorg **chem vapor deposition**
tantalum soln; **CVD** metalorg tantalum complex soln;
tantalum nitride metalorg **CVD** org solvent
IT Vapor deposition process
(metalorg.; Ta complexes solns. for metalorg. **chem. vapor deposition** and their Ta-contg. thin films)
IT 12033-62-4P, Tantalum nitride
(Ta complexes solns. for metalorg. **chem. vapor deposition** and their Ta-contg. thin films)
IT **169896-41-7** 210769-41-8 629654-48-4 629654-49-5
629654-53-1
(Ta complexes solns. for metalorg. **chem. vapor deposition** and their Ta-contg. thin films)
IT 79-20-9, Methyl acetate 110-54-3, Hexane, uses 110-82-7, Cyclohexane, uses 111-65-9, n-Octane, uses 112-40-3, n-Dodecane 123-86-4, Butyl acetate 124-18-5, Decane 141-78-6, Ethyl acetate, uses 540-84-1, Isooctane 628-63-7, Pentyl acetate
(solvent; Ta complexes solns. for metalorg. **chem. vapor deposition** and their Ta-contg. thin films)

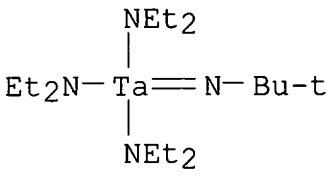
L24 ANSWER 4 OF 15 HCA COPYRIGHT 2006 ACS on STN
140:11360 Method for the sequential deposition of tantalum nitride. Cao, Wei; Chung, Hua; Ku, Vincent; Chen, Ling (Applied Materials, Inc., USA). U.S. Pat. Appl. Publ. US 2003224600 A1 20031204, 17 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-379438 20030304. PRIORITY: US 2002-2002/PV362189 20020304.
AB The invention relates to a method for the sequential deposition of tantalum nitride, where a Ta-contg. precursor and an N-contg. precursor are introduced into the chamber in an alternating fashion, such that the resulting film requires less post-deposition treatment that TaN films formed by conventional **CVD** or ALD. The method consists of the steps of (i) heating a TBTDET precursor to a predetd. temp. of at least 65.degree. to form a tantalum-contg. gas; (ii) forming a tantalum-contg. layer upon the substrate by adsorption of the tantalum-contg. gas onto the substrate; (iii)

reacting a nitrogen-contg. process gas with the tantalum-contg. layer to produce a layer of tantalum nitride; and (iv) repeating forming the tantalum-contg. layer and reacting the nitrogen-contg. process gas with the tantalum-contg. layer to form a layer of tantalum nitride of desired thickness, defining a final tantalum nitride layer.

IT **169896-41-7**
(tantalum precursor; method for sequential deposition of tantalum nitride)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-44

INCL 438684000

CC 76-2 (Electric Phenomena)

IT **169896-41-7**
(tantalum precursor; method for sequential deposition of tantalum nitride)

L24 ANSWER 5 OF 15 HCA COPYRIGHT 2006 ACS on STN

138:246966 Semiconductor device having barrier layer between ruthenium layer and metal layer and method for manufacturing the same. Park, Hee-Sook; Choi, Gil-Heyun; Lee, Seung-Hwan; Lee, Yun-Jung (Samsung Electronics Co., Ltd., S. Korea). U.S. Pat. Appl. Publ. US 2003060042 A1 20030327, 15 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-127651 20020422. PRIORITY: KR 2001-58557 20010921.

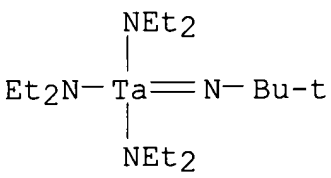
AB The present invention relates to a semiconductor device having a barrier layer between a ruthenium layer and a metal layer and a method for manufg. the same. A Ru layer is formed on a semiconductor substrate in a processing chamber. A barrier layer is formed on the Ru layer supplying a halide-free precursor in the processing chamber. A metal layer such as an Al layer, an Al alloy layer, a W layer, or a Cu layer is formed on the barrier layer. The barrier layer is 1 of a TiN layer, a TaN layer, a WN layer, and an MoN layer. The TiN layer is 1 of formed by using an **MOCVD** process and an ALD process, and the halide-free precursor is a Ti compd. selected from the group consisting of pentakis(diethylamino) Ti, tetrakis(diethylamino) Ti, tetrakis(dimethylamino) Ti, and pentakis(dimethylamino) Ti. The TaN layer is formed by using 1 of

an **MOCVD** process and an ALD process, and the halide-free precursor is a Ta compd. selected from the group consisting of t-butyltetrakis(diethylamino) Ta, pentakis(diethylamino) Ta, tetrakis(dimethylamino) Ta, and pentakis(dimethylamino) Ta.

IT **169896-41-7**
(vapor deposition precursor; semiconductor device having barrier layer between ruthenium layer and metal layer and method for manufg. the same)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-8234
ICS H01L021-8244; H01L021-44

INCL 438653000; 438686000; 438681000

CC 76-3 (Electric Phenomena)

IT **Vapor deposition** process
(**chem.**, at. layer; semiconductor device having barrier layer between ruthenium layer and metal layer and method for manufg. the same)

IT 3275-24-9, Tetrakis(dimethylamino) titanium 4419-47-0, Tetrakis(diethylamino) titanium 7550-45-0, Titanium tetrachloride, reactions 19824-59-0, Pentakis(dimethylamino) tantalum 55161-66-5, Ethanamine, N-ethyl-, tantalum(5+) salt **169896-41-7**
(vapor deposition precursor; semiconductor device having barrier layer between ruthenium layer and metal layer and method for manufg. the same)

L24 ANSWER 6 OF 15 HCA COPYRIGHT 2006 ACS on STN

136:254729 Plasma-enhanced atomic layer deposition of Ta-N thin films. Park, Jin-Seong; Park, Hyung-Sang; Kang, Sang-Won (Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Taejon, 305-701, S. Korea). Journal of the Electrochemical Society, 149(1), C28-C32 (English) **2002**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

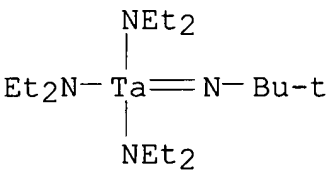
AB The plasma-enhanced at. layer deposition (PEALD) of TaN thin films was performed using terbutylimidotris(diethylamido)tantalum and H radicals at 260.degree.. The film thickness per cycle is also self-limited at 0.8 .ANG./cycle, which is thinner than that of the

conventional at. layer deposition (ALD), 1.1 .ANG./cycle. X-ray diffraction anal. indicates that the as-deposited films are not amorphous but polycryst. mixed with cubic TaN and TaC. The film crystallinity as well as the film d. increases with the pulse time and the elec. power of the H plasma used. By the H radical as a reducing agent instead of NH3, which is a typical reactant gas used in ALDs and **MOCVD** of TaN, the films show a much lower elec. resistivity and show no aging effects under exposure to air, owing to the increased film d. and crystallinity, and the presence of TaC bonding. In addn., it was shown that films, which are formed by the PEALD, retain perfect step coverage on the submicrometer holes with an aspect ratio of 10:1.

IT **169896-41-7**
(precursor; plasma-enhanced at. layer deposition of TaN thin films from)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



CC 75-1 (Crystallography and Liquid Crystals)

IT **169896-41-7**
(precursor; plasma-enhanced at. layer deposition of TaN thin films from)

L24 ANSWER 7 OF 15 HCA COPYRIGHT 2006 ACS on STN

134:319599 Method for fabricating gate oxide layer for a semiconductor device. Huang, Kuo-Tai; Huang, Michael W. C.; Yew, Tri-Rung (United Microelectronics Corp., Taiwan). U.S. US 6221712 B1 **20010424**, 8 pp. (English). CODEN: USXXAM. APPLICATION: US 1999-385805 19990830.

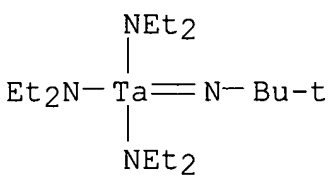
AB A method is provided for fabricating a gate structure. The method involves providing a substrate, followed by forming a nitride region on a surface of the substrate. With a Ta-based org. compd. and a Ti-based org. compd. serving as precursors, an metalorg. **CVD** (**MOCVD**) is performed, so that a Ta2-xTixO5 dielec. layer is formed on the substrate. A barrier layer, a conducting layer, and an anti-reflection (AR) layer are then formed in sequence on the Ta2-xTixO5 dielec. layer. Subsequently, the AR layer, the conducting layer, the barrier layer, and the Ta2-xTixO5 dielec. layer are defined to form a gate structure on the substrate of the nitride region. The Ta-based org. compd. in this case may include a

Ta-alkoxide compd., whereas the Ti-based org. compd. may include a Ti-alkoxide compd. or a Ti-amide compd.

IT **169896-41-7**
(vapor deposition precursor; method for fabricating gate oxide layer for a semiconductor device)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM B32B019-00

INCL 438240000

CC 76-3 (Electric Phenomena)

IT 546-68-9, Titanium tetra-isopropoxide 3087-39-6, Titanium tetrakis(t-butoxide) 3275-24-9, Titanium tetrakis(dimethylamide) 4419-47-0, Titanium tetrakis(diethylamide) 6074-84-6, Tantalum ethoxide 52406-69-6 52406-81-2 **169896-41-7** 172901-22-3 177580-52-8 177580-53-9 238757-13-6
(vapor deposition precursor; method for fabricating gate oxide layer for a semiconductor device)

L24 ANSWER 8 OF 15 HCA COPYRIGHT 2006 ACS on STN

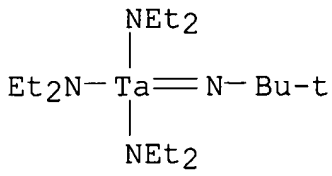
134:260170 Formation of dielectric layer of capacitor. Fuang, Guo Tai; You, Cui Rong (Lien Hua Electronics Co., Ltd., Taiwan). Jpn. Kokai Tokkyo Koho JP 2001085423 A2 **20010330**, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-256379 19990909.

AB The title method involves prepg. an org. compd. contg. Ta and an org. compd. contg. Ti, and carrying out **MOCVD** using the org. compds. as precursors. A dielec. layer of tantalum titanium oxide having a high dielec. const. is formed. A method is also described, for forming a capacitor of a DRAM using the above method.

IT **169896-41-7**
(**MOCVD** of tantalum titanium oxide dielec. layer of capacitor)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-316
ICS C23C016-40; H01L021-31; H01L027-108; H01L021-8242; H01G004-33; H01G004-10
CC 76-10 (Electric Phenomena)
Section cross-reference(s): 75
ST **MOCVD** tantalum titanium oxide dielec film DRAM capacitor
IT Memory devices
(DRAM (dynamic random access); **MOCVD** of tantalum titanium oxide dielec. layer of capacitor)
IT Capacitors
Dielectric films
(**MOCVD** of tantalum titanium oxide dielec. layer of capacitor)
IT Vapor deposition process
(metalorg.; **MOCVD** of tantalum titanium oxide dielec. layer of capacitor)
IT 60866-78-6, Tantalum titanium oxide
(**MOCVD** of tantalum titanium oxide dielec. layer of capacitor)
IT 546-68-9, Titanium tetraisopropoxide 3087-39-6 3275-24-9, Titanium tetrakisdimethylamide 4419-47-0, Titanium tetrakisdiethylamide 6074-84-6, Tantalum pentaethoxide 52406-69-6 **169896-41-7** 172901-22-3 177580-52-8 177580-53-9 238757-13-6
(**MOCVD** of tantalum titanium oxide dielec. layer of capacitor)

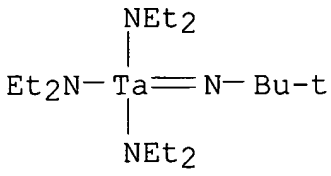
L24 ANSWER 9 OF 15 HCA COPYRIGHT 2006 ACS on STN
133:97909 Formation of copper thin films by **chemical vapor deposition**. Kusumoto, Toshiro; Murata, Masaaki; Ichihashi, Motoko (ULVC Japan, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2000195863 A2 **20000714**, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-370603 19981225.
AB The processes involves depositing TiN or TaN thin films on substrates with barrier metal films by **CVD**, followed with depositing Cu thin films by **CVD**. The raw materials for Cu thin film deposition may be Cu(I)(HFAC)VTMS or Cu(II)(HFAC)2. The raw materials for TiN film may be Ti(NMe2)4, Ti(NEt2)4, and/or Ti(i-PrNMe)4 and the raw materials for TaN may be Ta(NMe2)5 and/or Ta:N(tert-butyl)(NMe2)3. The **CVD**-Cu film have excellent

adhesion and smoothness.

IT **169896-41-7**
(formation of copper thin films on substrates with barrier metal films by **CVD**)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-3205
ICS C23C016-18; C23C016-34; H01L021-285

CC 76-3 (Electric Phenomena)

ST copper thin film formation **CVD** underlayer; titanium nitride underlayer copper thin film **CVD**; tantalum nitride underlayer copper thin film **CVD**

IT 7440-50-8P, Copper, preparation
(formation of copper thin films on substrates with barrier metal films by **CVD**)

IT 3275-24-9, Tetrakis(dimethylamino)titanium 4419-47-0, Tetrakis(diethylamino)titanium 14781-45-4 19824-59-0, Pentakis(dimethylamino)tantalum 139566-53-3, Copper(I) hexafluoroacetylacetonate trimethylvinylsilane **169896-41-7** 282107-41-9
(formation of copper thin films on substrates with barrier metal films by **CVD**)

IT 12033-62-4, Tantalum nitride 25583-20-4, Titanium nitride
(thin films, formation of, by **CVD**; formation of copper thin films on substrates with barrier metal films by **CVD**)

L24 ANSWER 10 OF 15 HCA COPYRIGHT 2006 ACS on STN

132:230668 Method for forming a three-component nitride film containing metal and silicon for semiconductor device fabrication. Yi, Kyoung-soo; Koh, Won-yong; Kang, Sang-won (Genitech Co., Ltd., S. Korea). PCT Int. Appl. WO 2000016377 A2 **20000323**, 13 pp. DESIGNATED STATES: W: JP, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1999-KR534 19990910. PRIORITY: KR 1998-37257 19980910; KR 1998-48993 19981116.

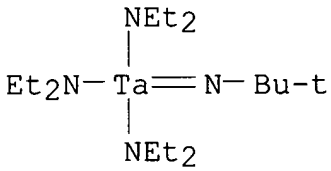
AB The method of the present invention comprises the steps of: prepg. sep. reactive gases each including at least one selected from the group consisting of a gaseous metal compd., a gaseous Si compd. and

an NH3 gas under conditions such that the gaseous metal compd. and the NH3 gas does not form a mixt.;. Detg. a sequential gas supply cycle of the reactive gases so that supplies of the gaseous metal compd., the gaseous Si compd. and the NH3 gas are each included at least once within one gas supply cycle; and applying the reactive gases to the substrate by repeating the gas supply cycle at least once. According to the present invention, a three-component nitride film can be formed with a uniform thickness despite unevenness of a semiconductor substrate surface.

IT **169896-41-7**, Tris(diethylamido)(tert-butylimido)tantalum
(method for forming three-component nitride film contg. metal and silicon for semiconductor device fabrication)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L

CC 76-3 (Electric Phenomena)
Section cross-reference(s): 75

ST **OMCVD** metal nitride silicide film

IT 3275-24-9, Tetrakis(dimethylamido)titanium 4419-47-0, Tetrakis(diethylamido)titanium 7664-41-7, Ammonia, reactions 7803-62-5, Silane, reactions **169896-41-7**, Tris(diethylamido)(tert-butylimido)tantalum
(method for forming three-component nitride film contg. metal and silicon for semiconductor device fabrication)

L24 ANSWER 11 OF 15 HCA COPYRIGHT 2006 ACS on STN

130:183429 Composite material and its manufacture. Breme, Frank; Guther, Volker; Van Osten, Karl-Uwe (GfE Metalle und Materialien G.m.b.H., Germany). Eur. Pat. Appl. EP 897997 A1 **19990224**, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (German). CODEN: EPXXDW. APPLICATION: EP 1998-115821 19980821. PRIORITY: DE 1997-19736449 19970821.

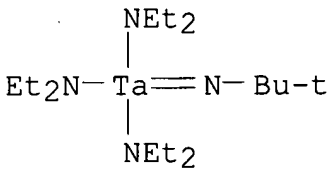
AB The composites comprise a plastic substrate and a deposited continuous layer (thickness <2 .mu.m) of a ductile metal-contg. compd. MaObCxNyBz (M = Ti, Ta, Nb, Zr, Hf; a = 0.025-0.9; b = 0.025-0.7; x = 0.2-0.9; y, z = 0-0.7; a + b + x + y + z = 1) such that the M concn. (a) increases continuously from the substrate interface (where a is .apprxeq.0) to the surface of the deposited

layer, and are prepd. by activating the plastic surface, vapor-depositing an appropriate metal compd. at .ltoreq.100.degree., and treating with a plasma at <50 millibars. The products find use in medical technol. as prostheses, etc. Thus, poly(ethylene terephthalate) was surface-treated with a 50-W inductive plasma (13.56 MHz) for 3 min at .apprx.1 millibar, heated to .apprx.100.degree., then treated with Ti(NMe2)4 vapors in a H carrier gas stream at 5.degree., and exposed to a low-pressure plasma. The coating adhered to the substrate with peel strength >6 N/mm2 and showed cond. 2.1 (.OMEGA.-cm)-1 initially, which decreased to 0.18 (.OMEGA.-cm)-1 after 3 days exposure to air.

IT **169896-41-7**
(composite material by **CVD** of)

RN 169896-41-7 HCA

CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM C23C016-30
ICS C23C016-18; C23C016-02

CC 38-2 (Plastics Fabrication and Uses)
Section cross-reference(s): 42, 57, 63

ST ceramic thermoplastic composite prosthesis; **chem vapor deposition** plasma assisted

IT **Vapor deposition** process
(**chem.**; in manuf. of composite materials)

IT Prosthetic materials and Prosthetics
(composites, ceramic-plastic; manuf. of composite materials by **CVD**)

IT Plasma
(low-pressure; in manuf. of composite materials by **CVD**)

IT Fluoropolymers, uses
Polyamides, uses
Polyesters, uses
Polyurethanes, uses
(substrate; composite material by **CVD** on)

IT 1333-74-0, Hydrogen, uses
(carrier gas; in manuf. of composite materials by **CVD**)

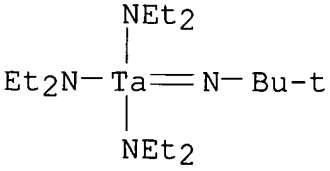
IT 3275-24-9, Tetrakis(dimethylamino)titanium 19824-58-9, Pentakis(dimethylamino)niobium 19824-59-0, Pentakis(dimethylamino)tantalum 25169-05-5, Pentakis(diethylamino)niobium 55161-66-5,

Pentakis(diethylamido)tantalum **169896-41-7** 210363-27-2
(composite material by **CVD** of)
IT 9002-84-0, PTFE 9003-07-0, Polypropylene 25038-59-9,
Poly(ethylene terephthalate), uses
(substrate; composite material by **CVD** on)

L24 ANSWER 12 OF 15 HCA COPYRIGHT 2006 ACS on STN
127:271322 Fabricating a tantalum nitride diffusion barrier for copper metalization. Sun, Shi-chung; Chiu, Hien-tien; Tsai, Ming-hsing (United Microelectronics Corp., Taiwan). U.S. US 5668054 A **19970916**, 10 pp. (English). CODEN: USXXAM. APPLICATION: US 1996-584749 19960111.

AB A process for fabricating a TaN diffusion barrier for the advanced Cu metalization of semiconductor devices is disclosed. The process comprises prepg. a semiconductor device fabricated over the surface of a Si substrate having a component with a fabricated contact opening. Before the formation of the Cu contact by deposition, the process performs a TaN low-pressure **CVD** procedure that deposits a TaN film over the substrate. After the Cu deposition, a photoresist layer is subsequently fabricated for patterning the deposited Cu contact and TaN layers, whereby the deposited film of TaN is patterned to form the metalization diffusion barrier for the semiconductor device. The TaN low-pressure **CVD** procedure includes depositing a layer of TaN using the metalorg. precursor tert-butylimido-tris(diethylamido)tantalum (TBTDET) in a cold-wall low-pressure reactor with a base pressure of .apprx.10-5 torr. The source of the metalorg. precursor is vaporized at .apprx.40-50.degree.. The typical deposition pressure is .apprx.20 mtorr. A TaN layer of low C content and low resistivity may thus be formed in the disclosed **CVD** procedure having effective capability against Cu diffusion.

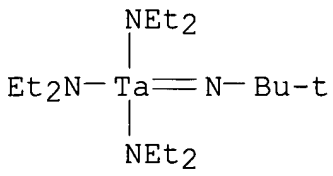
IT **169896-41-7**, Tertbutylimidotris(Diethylamido)tantalum
(fabricating a tantalum nitride diffusion barrier for copper metalization by **CVD** from)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



IC ICM H01L021-28
INCL 438653000
CC 76-3 (Electric Phenomena)

IT **Vapor deposition** process
(**chem.**; of tantalum nitride diffusion barrier for copper metalization in a semiconductor device)
IT **169896-41-7**, Tertbutylimidotris(Diethylamido)tantalum
(fabricating a tantalum nitride diffusion barrier for copper metalization by **CVD** from)

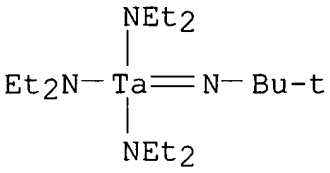
L24 ANSWER 13 OF 15 HCA COPYRIGHT 2006 ACS on STN
126:285955 Properties of metalorganic **chemical vapor deposited** tantalum nitride thin films. Sun, S. C.; Tsai, M. H.; Tsai, C. E.; Chiu, H. T. (National Nano Device Laboratory, Institute of Electronics, National Chiao Tung University, Taipei, Peop. Rep. China). Proceedings - International Conference on Solid-State and Integrated Circuit Technology, 4th, Beijing, Oct. 24-28, 1995, 547-549. Editor(s): Baldwin, Gary L. Institute of Electrical and Electronics Engineers: New York, N. Y. (English) **1995**. CODEN: 64CRAT.
AB Low-resistivity Ta nitride (TaN) films were successfully realized by low-pressure metalorg. **CVD** using a new precursor TBTDET (terbutylimido-tris-diethylamino Ta). Data from TEM and XRD anal. indicated that 600.degree. as-deposited films exhibit the polycryst. structure with <200> preferred orientation. **CVD** TaN films were studied as diffusion barriers for Cu and Al interconnections.
IT **169896-41-7**
(starting material; properties of **MOCVD** tantalum nitride thin films)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75
ST **MOCVD** tantalum nitride film; resistance tantalum nitride film; diffusion barrier tantalum nitride film
IT Vapor deposition process
(metalorg.; properties of **MOCVD** tantalum nitride thin films)
IT Diffusion barrier
Electric resistance
Polycrystalline films
(properties of **MOCVD** tantalum nitride thin films)

IT 7440-44-0, Carbon, occurrence 7782-44-7, Oxygen, occurrence
(properties of **MOCVD** tantalum nitride thin films)
IT 12033-62-4P, Tantalum nitride (TaN)
(properties of **MOCVD** tantalum nitride thin films)
IT **169896-41-7**
(starting material; properties of **MOCVD** tantalum nitride thin films)

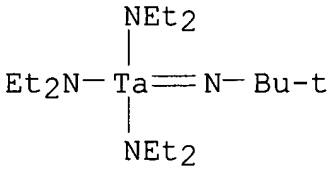
L24 ANSWER 14 OF 15 HCA COPYRIGHT 2006 ACS on STN
124:329193 Performance of **MOCVD** tantalum nitride diffusion barrier for copper metalization. Sun, S. C.; Tsai, M. H.; Tsai, C. E.; Chiu, H. T. (Department Electronics Engineering, National Chiao Tung University, Hsinchu, Taiwan). Symposium on VLSI Technology, Digest of Technical Papers, 15th, Kyoto, June 6-8, 1995, 29-30. Business Center for Academic Societies Japan: Tokyo, Japan. (English) **1995**. CODEN: 62PWAR.
AB A low-resistivity and low C concn. **CVD** TaN film was realized by using a new precursor terbutylimido-tris-diethylamido Ta (TBTDET). **CVD** TaN as a diffusion barrier for Cu has higher thermal stability up to 500.degree. than **CVD** TiN of 450.degree..
IT **169896-41-7**, Tertbutylimido-tris-diethylamido Tantalum
(performance of **MOCVD** tantalum nitride diffusion barrier for copper metalization)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75
ST **MOCVD** tantalum nitride diffusion barrier copper; metalization copper interconnection diode
IT Diodes
Vapor deposition processes
(performance of **MOCVD** tantalum nitride diffusion barrier for copper metalization)
IT Electric conductors
(interconnections, performance of **MOCVD** tantalum nitride diffusion barrier for copper metalization)
IT **169896-41-7**, Tertbutylimido-tris-diethylamido Tantalum
(performance of **MOCVD** tantalum nitride diffusion

barrier for copper metalization)
IT 12033-62-4P, Tantalum nitride (TaN)
(performance of **MOCVD** tantalum nitride diffusion barrier for copper metalization)

L24 ANSWER 15 OF 15 HCA COPYRIGHT 2006 ACS on STN
123:302763 Metalorganic **chemical vapor deposition** of tantalum nitride by tertbutylimidotris(diethylamido)tantalum for advanced metalization. Tsai, M. H.; Sun, S. C.; Chiu, H. T.; Tsai, C. E.; Chuang, S. H. (Institute Electronics, National Chiao Tung University, Hsinchu, 30050, Taiwan). Applied Physics Letters, 67(8), 1128-30 (English) **1995**. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.
AB The authors deposited tantalum nitride (TaN) films by low-pressure metalorg. **CVD** (LP-**MOCVD**) using a new precursor tertbutylimidotris(diethylamido)tantalum (TBTDET). Strong Ta-N double bond in the precursor preserved the TaN portion during the pyrolysis process. This method has yielded low-resistivity films. It changed from 10 m.OMEGA. cm (deposited at 500.degree.) to 920 .mu..OMEGA. cm (obtained at 650.degree.). The carbon and oxygen concns. were low in the films deposited at 600.degree., as detd. by XPS. TEM and x-ray diffraction anal. indicated that the as-deposited films exhibited polycryst. structures with the lattice consts. close to the bulk TaN value. The TaN barrier layer was successfully applied as a glue layer for **CVD** tungsten (W) metalization schemes.
IT **169896-41-7**, Tertbutylimidotris(diethylamido)tantalum
(metalorg. **chem. vapor deposition** of tantalum nitride by tertbutylimidotris(diethylamido)tantalum for advanced metalization)
RN 169896-41-7 HCA
CN Tantalum, tris(N-ethylethanaminato)[2-methyl-2-propanaminato(2-)]-, (T-4)- (9CI) (CA INDEX NAME)



CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75
ST metalorg **chem vapor deposition** tantalum nitride; metalization tantalum nitride metalorg **CVD**
IT Electric contacts
Vapor **deposition** processes

(metalorg. **chem. vapor deposition**
of tantalum nitride by tertbutylimidotris(diethylamido)tantalum
for advanced metalization)

IT 12033-62-4P, Tantalum nitride
(metalorg. **chem. vapor deposition**
of tantalum nitride by tertbutylimidotris(diethylamido)tantalum
for advanced metalization)

IT **169896-41-7**, Tertbutylimidotris(diethylamido)tantalum
(metalorg. **chem. vapor deposition**
of tantalum nitride by tertbutylimidotris(diethylamido)tantalum
for advanced metalization)